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"OTACARIASIS" IN THE DOG AND CAT.

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THE literature of this important subject in the English language is indeed scant. So my apology is forthcoming in bringing before the notice of the readers of the VETERINARY JOURNAL my experiences in connection with it.

The first article claiming priority is that of Mr. A. J. Sewell, M.R.C.V.S. (Canine Specialist), who on August 22nd, 1891, contributed a very interesting article in the JOURNAL, entitled, "Canker of the Ear." Now, although I have carefully perused the literature of the veterinary profession in this country, I cannot state beyond cavil that the causation of this interesting affection has been relegated to an acarus before that article appeared, although, as will presently be seen, Continental authorities had met with it extensively, not only in the dog and cat, but in other animals as well.

In September of last year I was consulted respecting a pedigree fox terrier bitch, aged three years, which had a diseased eye (*Corneitis Ulcerosa*), the eye affected being the left. I may add that this animal had, for some time past, been subject to great irritation of both ears, notably the left, and my client's opinion was that, from sympathy with the affected eye, the ear adjacent was affected.

The patient, at the time of my primary examination, was in very poor condition, showing especially marked headache and inability to open the affected eye in any light beyond that of a moderate degree.

Particular notice was taken of the left ear, which at first I, too, considered was in sympathy with the affected eye, it being hot, somewhat swollen, denuded of hair, and a source

of constant trouble to the animal, this being evinced by resistance to the touch, the ears being violently flapped, scratched, and head inclined to the ground, when the ear was rubbed vigorously for some minutes unless the animal was disturbed. My diagnosis as to the causation of these symptoms was doubtful; and in consequence, though solicited, I hesitated before definitely deciding. Whilst examining the ears I was particularly struck by the manner of a cat which entered the room, and more so as I was told that it, with another, cohabited with the bitch in question, and romped daily with it.

The cat's action was peculiar. She entered the room with her head carried low, inclined to one side, and occasionally scratched the back of the flap of the ear. On examination, this was found somewhat œdematous, hot, reddened, and the animal resented any manipulation of the head and ears.

Careful examination now of the meati of the ears of both cats and bitch revealed collection of hard wax, and interspersed amid the mass I could see tiny white specks, oval in shape, and exhibiting movement, especially if the animals were brought near a fire, excited, or forced to move actively.

I am of Mr. A. J. Sewell's opinion, that all cases of canker cannot satisfactorily be relegated to this cause; yet I am convinced, from the many cases I have recently had under treatment—some twenty-three in all, the animals affected being cats and dogs—that I have in sixteen discovered the acari in question.

Though incorrectly described by Mr. Sewell as being psoroptic, instead of symbiotic, I maintain that the best thanks of the profession are due to him, as being the first to ascribe a causation to the affection other than generally taught; for if we search veterinary periodicals for years past, scant information on diseases of the ear, exclusive of causation, can be discovered. Not so on the Continent; for I may add such world-renowned authors as Bendz, Zuern, Guzzoni, Mégnin and Nocard figure prominently.

The presence of these *Symbiotes auricularis Canis, etc.*, gives rise, especially in the dog, to a form of "otitis," known as canker, which occurs among sporting dogs as an "epizoötic," and in them frequently induces epileptiform symptoms. The fits never occur except when at exercise or work, and commence by the dog turning round a few times, and then falling to the ground. The patient will sometimes recover in a few minutes, and resume his work. Unlike epileptic seizures, however, these fits are not accompanied by any

involuntary discharges of fæces or urine, a point of very great import in the differentiation of epilepsy from rabies, and *vice versâ*, otitis caused by the *Symbiotes auricularis Canis*, and epilepsy pure and simple.

I append the names and titles of publications in connection with canker of the ear in the dog and other animals, from a comparative point of view.

Authorities.—The parasite being first described by Hering ("Magazin de Gurlt," 1835. 2e cahier), who incorrectly named it the *Symbiotes Cynotis;* Lucas.—"Ann. de la Soc. Entomol, de France," 1849, p. 39; Bendz.—"Tidsskrift for Veterinarei," X. ("Repertorium de Hering," 1863, p. 66); Zuern.—"Wochinochi f. Thierkeilk u. Vierzucht," 1874. No. 31; Guzzoni.—"Sull' acariasi del condotto auditivo esterno." Milan, 1877; Megnin.—"Bull. de la Soc. Cent. de Med. Veter. 1878. ("Rec. de Med. Veter," 1878, p. 209); "Bulletin de la Societé de Biologie," 1881, p. 62; and finally, that is until the advent of A. J. Sewell's article—M. Nocard. "Bull. de la Soc. Cent. de Med. Veter." ("Rec. de Med. Veter," 1882, p. 375).

The designation of this affection to my mind, is that given by Messrs. Raillet and Cadiot, in the "Recueil de Medicine Vétérinaire," 15th February, 1892, wherein it is described as "Symbiotic Otacariasis" in carnivora.

M. Nocard's experiments tend to the belief that:—

1. Otacariasis is readily transmissible from an affected individual to healthy individuals of the same species.
2. That transmission is more difficult between cat and dog.
3. That it does not take place between the ferret and the dog.

These results are, moreover, in conformity with the morphological data we possess regarding auricular symbiotes.

Further, if one institutes a comparison between the parasite of the dog and the cat, and that of the cat with that of the ferret, it will be observed that nearly all the dimensions overlap one another; so that certain species taken from the cat may be of the same size as others taken from the dog, and similarly with symbiotes of the ferret and cat.

Especially well marked is the difference in size between the parasite of the ferret and that of the dog. For, according to this distinction, it is easy to understand that the species proper to the cat could live on the dog, whilst that of the

ferret ought only to very slightly accustom itself to its new habitat on that animal.

It is probable also that transmission is possible from the ferret to the cat; but if we have neglected to experiment in this direction it is on account of the relations between these animals being so slight, and, again, these observations of size having been ascertained too late.

I hope at some future time to give in detail my experiences of the *Symbiotes auricularis Canis*, and results of experiments conducted in the way of transmission to other animals, and finally suggest the probable connection of the so-called Menier's disease in the horse with the presence, primarily or secondarily, of an acarus within the ear, as in the dog, cat and other animals.

THE HOOF AND ITS CULTURE.*

BY WILLIAMSON BRYDEN, VETERINARY SURGEON, BOSTON, U.S.A.

PERMIT me to apologise for again trespassing on your time to call attention to the subject of the hoof and its culture.

The study of the horse's hoof and limbs, as most of you are aware, is not altogether new to me, for it is now almost twenty years since I first determined, after much hesitation, to send to the *Veterinarian* a little article claiming that bone spavin and some other diseases and defects of the horse's limbs were caused by defective hoofs. It was an event I will long remember, both for the anxiety it gave me (1) as to whether it would be considered worth publishing or be thrown into the waste basket, and (2) for the satisfaction and encouragement its appearance in print gave me.

For some three years previously I had mostly practised in accordance with the text books and lectures at college until convinced, not only of their error, but of the necessity for some system that must recognise the hoof when deranged or defective as the essential cause of most of the blemishes and diseases of the feet and limbs of the horse. Such a system is the only one that can ever relieve us from the confusion we are in on the subjects of soundness, heredity, etc., or help us out of the ruts such eminent writers as Percivall and a few others led the profession into, until their theories and practices have become to the veterinary surgeon like a creed, which it would be audacity to question. It makes no difference how much the modern practitioner has failed to obtain the results promised or expected from the firing iron, the frog seton,

* A paper read before the Massachusetts Veterinary Association, in June, 1893.

tenotomy, neurotomy, and the whole array of other operations endorsed as so-called remedies by them, whether applied to the cause or the result.

My experiences, coupled with the success attending a rational treatment that discriminates between causes and results, compelled me to condemn and abandon the old methods, and advocate and practise something in harmony with a more consistent philosophy. The impulse to contribute something on this subject became so irresistible, that it has ever since been my greatest delight, not only to make of the horse's hoof a careful study, but to think, to practise, and try to impart to others whatever might be found beneficial to the profession, or lessen the sufferings of our humble patients.

It can now be demonstrated beyond a question that in such diseases as bone spavin, bog spavin, curb, splint, ringbones, etc., the hoof can be guided in a right as easily as in a wrong direction with complete success; so that such blemishes and diseases can be instantly arrested, and be made to gradually vanish just as they came, being due far more to afterbirth environment and mismanagement of the hoofs than to heredity. This is so certain that in nearly every case a cure can be warranted. The same may be said of navicular disease and the various forms of laminitis, side bones, and enlarged cartilages. They are entirely curable, if taken in time, even to an advanced stage, the age of the animal and length of time the defects have existed, demanding merely more time for readjustment and repair. Springhalt, paddling, interfering, overreaching, hitching, pacing, travelling one-sided, tripping, stumbling, etc, all depend upon hoof depravity. So-called scratches, scurfy and horny eruptions on the legs, also depend on the disturbed state of the skin of the pasterns and ankles from irritation, interrupted circulation and embarrassed functions, caused by a contracted or unthrifty hoof, the result being frequently the transplanting of the horn and hair elements, as well as cutaneous and sub-cutaneous tissues; all these again become normal after the hoof is properly opened up. Tissue metamorphosis in the solipede, I predict, will yet become a subject of the highest interest to the student of comparative medicine—(1) on account of a difference from orthopœdics in human surgery, and (2) the fact that such changes are probably as much physiological as pathological, the rectification of imperfect horse's limbs being very different from what is required in human limbs.

The tenacity with which veterinary surgeons still adhere to old mysterious notions and traditions—even after the

failures and disappointments that have ever attended their practice, of this branch of the profession, and for so many years—can only be explained by characterising their whole system of treatment as "temporising expedients," mostly tricks and patchwork; that their patience was not exhausted long ago, nor their veterinary genius stimulated, is hardly creditable either to their ingenuity or their enterprise. Medical men— some of them eminent—to whom these features of the subject (the ætiology of tissue changes) have been submitted, pronounce them to be in entire harmony with sound medical philosophy, yet the veterinary surgeon either cannot or will not try to comprehend it; consequently, they blunder along, believing in and practising what never could be demonstrated by them, and causing a heavy average loss of animals every year, which might just as well be saved.

No one has suffered from the mistakes of the veterinary surgeon more than the horse-shoer—unless it be the poor horse. Their interference with the technical work of horse-shoeing has done more to confuse the smith and keep horse-shoeing backward than it has ever benefited the art. When one reflects on the various shoes recommended by the ordinary writer on horse-shoeing—such as high-heeled shoes and low-heeled shoes, tips and three-quarter shoes, bar shoes and jointed shoes, Charlier, La Fosse, so-called Goodenough, and those of a lot of others whose notions of what the hoof's requirements demanded, are as various as they are wrong; their treatment of the whole subject is so ridiculous that it would be picturesque, were it not for the sufferings the poor animals have been compelled to endure on account of such equivocal teachings.

The sacredness, too, with which the frog and the bars, the sole and the wall, have ever been regarded by these gentlemen, especially the veterinarians, is far from being creditable to their surgical instincts. The horse-shoer is not allowed by them to use either a rasp or a knife, excepting in the most inefficient manner, and the sight of a good buttress would throw the modern writer of veterinary works and text books and the professor of horse-shoeing into hysterics.

Hoof-culture is a benign process or system, no devil is to be cast out, consequently no sacrifice is necessary, and no torture is required.

I will not detain you with a detailed history of the early development of the hoof of the young foal, but will simply remark that in northern climates, where the winters are long, and the ground liable to be frozen for four or five months,

May and June are probably the best months for the young animal to be born in; the grass has then come to stimulate the milk-giving functions, the ground is soft, furnishing the best footing for the foal, and also for the mare, especially if she has been kept in a barn or stable on a dry floor all winter.

Begin early to watch the little hoofs. If they grow irregularly or become foul or the joints do not straighten properly, remember that the hoof is always reproducing itself, and if trimmed properly it can be guided to a renewed and more perfect growth, which always influences the limbs favourably, just as happens when the gardener prunes and trims and fertilizes trees, shrubs, and plants. This applies to the cultivation and management of the hoof, especially in a state of domestication, from birth to maturity, and after, as well.

In suitable surroundings an unembarrassed circulation can easily be maintained, so that the danger from hoof depravities becomes very trifling either from defective, irregular or unsymmetrical acquired development. When the gait is faulty, it is always due to the form and quality of the "horny box," and can be corrected at once. It is of great importance, too, to watch the way his hoofs are placed on the ground; for example, should one foot be placed on the toe and the other square on the sole, it is evident that the two limbs will not organise alike; walking on the toe indicates that something about the heels make it more comfortable for him to do this. But, after his heel is all right, it may still remain as a habit, and cannot be neglected with impunity. One or two hoofs sometimes grow less thrifty than the others, and one or more may grow deficient in form and quality. This happens to both male and female, but mostly to young animals reserved for stallions, being deprived of natural exercise, and their hoofs not getting proper tear and wear in suitable pasture—a matter of great importance—they acquire what are known as pin-toes or stallion-toes, and these require much care; yet the worst cases can be changed in from eight months to a year, into feet and limbs that are perfect. It is of great importance, too, that the character of the deformities and blemishes be early recognised and corrected, because a part like the limb or hoof that suffers from perverted or arrested growth of a part for a year or two before maturity, and during its growing period, is more liable to leave some trace than are adverse changes occurring after maturity.

As has already been said, the hoof is a part that is always reproducing itself. It consequently becomes of importance—

1st, to trim it and remove any obstacle to the new growth, such as the old contracted wall, sole, and frog, which only crowds the laminæ, arrests circulation, and hinders repair; 2nd, employ suitable remedies, especially such as will encourage the new growth to repair.

The diseases of horses' limbs must be divided into at least two classes.

1st, what may be called physio-pathological changes. These include such diseases as spavins of all kinds, curbs, splints, spring-halt, navicular disease, diseases of the lamina, so-called corns, quittors, etc., diseases and changes peculiar to the solipede species—all entirely curable, unless too long neglected, or improperly treated. They are always the results of hoof depravity, consequently impossible of successful treatment until the cause is removed by the renewed growth of horn; for then only can the derelict limb, or the parts enclosed in the "horny box," ever be repaired. To treat such defects locally or directly, can only fail, and the case end in disappointment.

2nd, what may be regarded as the other class, are such diseases and accidents as may affect any species of animal, and are generally amenable to direct or local treatment. A sharp distinction must be made between these two classes, for here is where the most signal failures to comprehend this subject, and treat the cases consistently and successfully, have occurred.

In what has just been described as the physio-pathological class, the following instructions must guide us in treatment.

1st, prepare the foot by softening the hoof, then reduce the wall all it will bear, rasp the wall thin, unless the animal is to be used, when enough must be left to nail the shoes to; the toe and the heels, however, must be well thinned, and so must the sole. If the bars are bent, they may be thinned out; but the heel wall must also be weakened to correspond with the bar, for if this is not done, it is liable to close. If the bar is straight, however, it may be left as a brace, to force the quarter out when the heel-wall opposed to it is weakened. This is better than tricks with "spreaders," which are seldom reliable.

When animals have been long affected, and must either go to pasture, or remain idle in the stable during treatment, reduce as much as possible the wall, sole, and frog. Do not make the feet tender, neither is it necessary to cause them pain or draw blood, even in the worst cases; be sure, however, and keep the hoofs soft, and use on soft ground.

A great mistake has always been made in paring, for example, the sole, and leaving the wall, the frog, and the bars untouched. Every part must be reduced in proper proportion, and the more thoroughly it is done, the better; for then it immediately starts on its reparative course. Mechanical interferences with the circulation, crowded structures like the defective sub-horny laminæ, and other transformed and degraded tissues, such as the unthrifty horn, which are a continual source of disturbance to the extremities, but can be so easily relieved, that pernicious growths, like enlarged cartilages, etc., are arrested, and gradually diminish until they become almost as natural as if they had never been involved in one of the adverse changes I have characterized as a secondary or physio-pathological transformation, a stage beyond the so-called physiological tissue changes, whether associated with atrophy or hypertrophy.

Nothing impels the advanced student of hoof culture to recognise its importance more than the benign methods demanded and the success attending its treatment, both when the hoof itself is diseased, and when it is the cause of defects and diseases on a remote part of the limb or body. I hardly dare to remark that in all probability defective hoofs have much to do with other defects, such as roaring, wind-sucking, cribbing, weaving, atrophied muscles, fistulous withers, poll evil, etc. If this subject had first been announced by some French or German professor, it might have been considered favourably; but emanating from one near home, it cannot be considered in less than a generation, and even then the veterinary surgeons who practise hoof culture can be counted on the fingers of one hand. They cannot grasp the principle.

The fact is, veterinary pathologists have hardly hinted at the hoof as being the cause of diseases appearing elsewhere in the horse's limbs or body; yet they imagined that they easily understood how bone spavin and splints might be caused by a blow or some mysterious diathesis. To discriminate between the ætiology of changes caused by a blow and the ætiology of the blemishes, transformations, and tissue changes peculiar to the horse's feet and legs, never seems to have entered their heads.

Old maxims, mysterious traditions, and "fake" practices and notions handed down from remote periods, the veterinary pathologist could always explain to the satisfaction of the profession; such simple faith has ever been accorded their teachings that they have ever been allowed to pass unquestioned.

This applies especially to the study of the locomotive organs of the horse and their treatment, which is still so coarse and inconsistent, that it is hardly creditable to the veterinary profession in the year 1893.

I again appeal to you to take up this glorious subject, and apologising for any censure I may have unjustly implied, for I am used to being censured and even sneered at, and have long and patiently submitted to the taunts and criticisms of both horsemen and veterinarians. They have pained me much.

In closing this article, I sincerely hope to find hoof culture before long one of our most interesting and popular professional topics, studied not only by members of the veterinary profession, but by the horse-shoer and the farmer, the farrier and the trainer, the gentleman of leisure and the owner. I also sincerely hope to see a horse-shoeing department in every college, liberally endowed, and showering blessings on our long-suffering and much abused friend, the horse.

TUBERCULOSIS OF THE BRONCHI, TRACHEA AND LARYNX IN THE DOG*.

BY PROFESSOR CADIOT, ALFORT VETERINARY SCHOOL.

THE lesions of Tuberculosis in the dog frequently take on the fibrous or hypertrophic forms in the glands and upon serous membranes, but these forms are rarer in the lungs, and I do not know that anyone has spoken, up to the present, of specific alterations of the trachea or the larynx. I exhibit to you portions of the respiratory organs of two tubercular dogs, in which the infective processes have caused, in several large bronchi, diffused fibrous vegetations, producing the almost complete obstruction of these passages; in one there exists neoplasms in the trachea, and a double pseudo-polypous tumour in the larynx. I will commence by giving you a brief history of this latter subject:—

Irish setter, four years old, belonging, since he was six months old, to M. G., 10, Boulevard Arago, Paris. Towards the end of his first year, this dog was attacked with bronchitis, which took on a chronic form. For about 18 months no change occurred in the condition of the disease, either for better or worse. In the spring of last year, the respiratory symptoms were complicated by digestive troubles. For some weeks the animal had a diminished appetite, and

* Read at the meeting of the Société Centrale de Méd. Vétérinaire, July 13th. Translated by Professor Bradley, New Veterinary College, Edinburgh.

frequent vomiting fits; he was placed on a milk diet. The vomiting fits were not long in disappearing but the cough became more frequent and stronger; the barking, before strong and clear, became dull, and at last certain phenomena presented themselves, which indicated a serious aggravation of the disease. The dog was continually lying down, often the respiration was doleful, the appetite was very capricious, there was gradual emaciation, and the barking becoming mournful, was only heard at long intervals. In a short time, the animal was completely dumb. The cough was replaced by a kind of whistling and laborious expiration. M. G. kept his dog in this condition for three months; then, seeing that the emaciation and feebleness increased, he brought it to the school at the commencement of October last, and left it with me.

Grave disturbances of respiration have been noted with reference to this disease. The performance of this act had become extremely difficult, expiration was silent, but inspiration was accompanied by a shrill noise, resembling that of roaring in the horse. Exercise and effort had become impossible; it was only necessary to make the patient go a few steps quickly, or to go upstairs, to produce signs of asphyxia; he would stop distressed, and sink down as if affected with syncope; in a few moments he would rise, with panting respiration, and an anxious expression; these troubles quickly disappeared if no further efforts were made. The animal absolutely refused any direct examination of the mouth and throat; on palpation of the larynx, a deformity of that organ was observed.

Autopsy.—No alteration of the abdominal viscera. On opening the chest some vegetations were seen upon the parietal and visceral pleuræ. The left lung showed an extensive lesion, its posterior lobe being large, dense and greyish; an incision made in the direction of its long axis disclosed a large cavity with uneven, thick and fibrous walls, into which the large bronchus of that side opened. The mucous membrane covering the latter was very much thickened, irregular, strewn with nodules, and covered with greenish muco-pus except towards its origin. Here and upon the terminal portion of the trachea were five small and flattened tumours of circular outline, depressed in their centre, the diameter of which varied from one to two centimetres, and several millimetres in thickness.

Another larger tumour was developed towards the lower half of the trachea. The larynx was almost completely

obstructed by a bi-lobular tumour of a polypous appearance, which extended into the pharyngeal opening, where it appeared surrounded by the arytenoids and the epiglottis. A glance at this portion will show that the tumour is part of the sub-epiglottidean sinus; it was developed along the vocal cords, which it almost completely enveloped, and of which only the anterior border could be distinguished.

The two parts of the neoplasm are joined towards their middle, and also in their inferior regions. Above the adherence there is between them, as well as between their summit and the arytenoid arch, a large space of some millimetres. This was the only channel through which air could still pass.

My second communication refers to a tuberculous bitch, in which the vegetations were confined to the bronchial mucous membrane.

A collie bitch, nine years old, affected from one year old, with carcinoma of the two last right neutral mammæ, belonging to M. M——, Rue du Bac 4, Paris. Left at the school on the 4th of May, 1893.

Autopsy.—Miliary tuberculosis of the parietal peritoneum, of the mesentery and of the omentum. A thick layer of tubercles was developed upon the posterior surface of the diaphragm. Very numerous hepatic tubercles, the majority of the size of a pea, spherical, calcified and easily enucleated; some were smaller, with a caseous centre.

Recent miliary tuberculosis and hypertrophy of the spleen. Tuberculosis of the kidneys; these organs were voluminous, and irregular on their surface, and appeared upon section to be strewn with little greyish granulations and hollowed out by several purulent centres of the size of a large pea, the contents of which were rich in bacilli. No alteration of the mesenteric glands or of the intestinal mucous membrane. A small quantity of greyish pleuritic exudate. Mediastinal tuberculosis of a very remarkable character; upon the posterior mediastinum were five isolated tuberculous masses, whose volume varied from that of an egg to that of the fist; their surfaces were greyish, and marked with thick ridges and fine vascular arborisations, strewn with a large number of small yellowish-white tubercles, semi-confluent; their section was fibrous, studded with calcified nodules. The sub-œsophageal gland was elongated, fusiform, of the size of a small egg, and stuffed with tubercles; the anterior mediastinum and all the posterior mediastinum contained between the attached surfaces of the afore-mentioned tumours, were covered with

isolated or confluent granulations. Careful examination of the lungs only showed a few small tubercles, except in the deep lobe of the right lung; this lobe was severely affected, the bronchial division which ramifies in it had its mucous membrane thickened and covered with a layer of firm, dense, and fibrous vegetations, which were continued into the corresponding large bronchus. No notable hypertrophy of the bronchial glands.

Microscopic examination of the bronchial vegetations and of the laryngeal tumour of the first subject, showed the identity in structure of these neoplasms. They are composed of closely-joined fibrous bundles, scattered irregularly and surrounding narrow spaces filled with epithelioid cells, rounded or fusiform, according to their position; the majority of these cellular heaps have undergone caseous degeneration in their central parts; the mucous chorium is thickened and fibrous. On their surfaces these vegetations are still partially covered by a layer of stratified epithelium. I made a great number of preparations without being able to discover bacilli in them; but after recognising the tuberculous nature of the bronchial lesions of my second subject, I recommenced the examination of these portions. In sections which had been 24 hours in Erlich's solution, I was able at last to demonstrate, in several tubercular follicles, the characteristic bacilli. The bronchial vegetations from the subject of my second communication offered the same particulars of structure as the preceding. On sections made perpendicular to the surface, they were found to be made up of closely-joined fibrous tissue infiltrated with embryonic elements; in places, tuberculous centres are met with, having a caseous appearance towards their central parts, and in which the elements of the peripheral zone are for the most part rounded, some few being epithelioid. The bacilli are less rare in this than in the preceding lesions. A certain number can be seen in almost all the preparations.

No case of this vegetative form of tuberculosis in the dog has, as yet, been reported. The particular alterations which are produced have evidently been mistaken for epitheliomatous or sarcomatous neoplasms.

AN OUTBREAK OF RABBIT SEPTICÆMIA, WITH OBSERVATIONS ON THE NATURE OF THE DISEASE AND ITS SPECIFIC ORGANISM.

BY VERANUS A. MOORE, B.S., M.D., AND F. L. KILBORNE, B.AG., B.V.S., OF THE DIVISION OF ANIMAL PATHOLOGY, BUREAU OF ANIMAL INDUSTRY, DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.

IN the winter and spring of 1893, a considerable number of rabbits, in the breeding-pens at the Experiment Station of the Bureau of Animal Industry, perished from a disease which was characterized by exudative pleuritis, with or without pneumonia. In a few of the animals there was marked peritonitis. In the exudates, a germ, which was identified as the bacillus of rabbit septicæmia, was invariably demonstrated. The infrequency with which spontaneous outbreaks of rabbit septicæmia occur, led to a somewhat careful study of this disease, the more important features of which, together with the result of a few investigations with the specific organism, are here recorded.

The investigations of rabbit septicæmia which have heretofore been made, have pointed out two very interesting facts. (1) *The existence of a bacillus in decomposed albuminous substance, and in contaminated water†, which is capable of producing a rapidly fatal septicæmia in rabbits when they are inoculated with these substances or with a pure culture of the bacillus; and (2) the appearance of a disease in rabbits caused by a bacillus closely related to, if not identical with, the one found in the first instance. The only report of this disease occurring spontaneously in rabbits appears to be that of Dr. Theobald Smith‡ in 1887. Although it is not our purpose to discuss the identity of the germ which is capable of inducing a fatal septicæmia when injected into rabbits, with the one which found its way on the body of the animal apparently by a more natural method, it seems desirable to point out the two sources from which the germ has been obtained, and the two conditions under which the disease has been described.

In the outbreak from which Dr. Smith obtained the germ which he studied, eight rabbits were known to have perished. The lesions found in the animals that were examined, were characterized by an inflammatory condition of one or more of the serous membranes. The bacteria were found in large

* Koch, Wundinfectionskrankheiten, Leipzig, 1878, p. 59.

† Gaffky, Mittheilungen, a, d, Kais. Gesundheitsamte, 1881, I.

‡ A contribution to the study of the microbe of rabbit septicæmia. The Journal of Comparative Medicine and Surgery, Vol. VIII. (1887), p. 24.

numbers in both the inflammatory products and the various organs. They were rapidly fatal to rabbits when injected subcutaneously in small quantities of a pure culture.

In the epizootic of this disease about to be described, the features that are worthy of special consideration are: (1) The very marked localization of the lesions; (2) The relation that exists between the fatal form of the disease and a rhinitis (not necessarily contagious); (3) The feeble virulence of the specific germ and its relation, morphologically, biologically and in its pathogenic properties, to attenuated swine plague bacteria. The study of the specific organism of this outbreak is of considerable interest, in view of the fact that the writings of several investigators tend to identify the bacillus of rabbit septicæmia with that of *Swine Plague*, *Schweineseuche*, *Wildseuche*, *Fowl Cholera*, a peculiar form of pneumonia in cattle, and possibly other forms. The very close relation that exists between the specific bacteria of these diseases was very clearly set forth by Dr. Theobald Smith as early as 1891.* The disease in rabbits appears not to have heretofore been traced from primary lesions in the nasal mucosa to its more fatal localisation on the serous membranes.

History of the Outbreak.

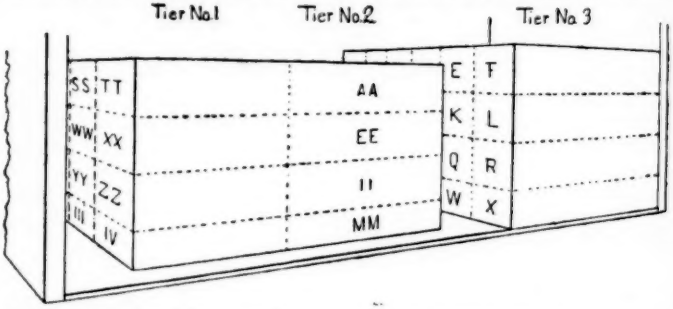
From time to time, one or more of the breeding rabbits at the Experiment Station have been observed to be suffering from what appeared to be a nasal catarrh, or "snuffles," as the affection was termed. Occasionally rabbits have died presumably from this trouble. The infrequency of such deaths among the rabbits was very largely the reason for a less active investigation of the isolated cases, for such occasional deaths were naturally attributed to confinement, old age, or accidental causes. The young, or stock rabbits, rarely suffered from this affection.

During the winter of 1892-93 a considerable number of the stock rabbits, one-half to three-fourths grown, were kept in a small detached stable. Several of these rabbits died of pneumonia and pleurisy, and nearly all of the others were observed to be suffering from a muco-purulent discharge from the nasal cavities. Little notice was taken at that time of the deaths or of the nasal difficulty, which were attributed to pneumonia and nasal catarrh due to the exposure of the rabbits to the sudden changes of temperature and the excessively cold weather, to which they were not accustomed. Later, the

* Special report on the cause and prevention of swine plague. Department of Agriculture, 1891, p. 141.

breeding rabbits which were kept in another building began to die. During March three or four died suddenly, and upon examination were found to be similarly affected as those dying from the stock-pen. It was also observed that many of the other rabbits were suffering from a similar rhinitis.

The rabbits kept for breeding purposes were housed in pens about three feet wide and four feet deep. These were arranged in three tiers each four pens high. (See diagram of pens.) The pens were in a small building, which, during the winter, was kept at a temperature of about 60 to 70° F. during the day, and 45 to 60° F. during the night, by means of a coal



QQ	RR	SS	TT
UU	VV	WW	XX
Y	YY	Z	ZZ
I	II	III	IV

AA	BB	CC	DD
EE	FF	GG	HH
II	JJ	KK	LL
MM	NN	OO	PP

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X

Tier No.1: Front View. Tier No.2 Front View. Tier No.3 Front View.

stove. The light was good, but during the winter the ventilation was not as good as could be wished. The rabbits were not crowded. They had plenty of water, and their food consisted of clover hay, oats and wheat bran mixed, and more or less green vegetables. Cut hay was used for bedding. The pens were kept clean, and every known precaution was taken to promote the health of the animals. The young of these rabbits were removed to the stock-pens as soon as they were of sufficient age. The rabbits were thrifty and in good condition when the disease appeared, and with few exceptions the dead rabbits were not emaciated. The accompanying diagram shows the arrangement of the pens.

Rabbit. No.	Date of Death.	Rabbit from Pen.	Condition of Pleura.	Condition of Lungs.	Condition of Peritoneum.	Cultures from Blood.	Cultures from Liver.	Cultures from Exudates.	REMARKS.
454	March 29	AA	Exudative pleuritis	Hepatised	Normal*	Clear	Clear	Bacteria†	
459	April 1	BB	,,	Partially collapsed	Peritonitis	,,	,,	,,	
460	,, 1	YY	,,	Hepatised	Normal	,,	Bacteria	,,	
476	,, 10	M	,,	,,	,,	,,	Clear	,,	
477	,, 10	MM	,,	Partially collapsed	,,		,,	,,	
478	,, 11	I	,,	Hyperæmic	,,	Clear	,,	,,	
479	,, 12	..	,,	Partially collapsed	,,	,,	Bacteria	,,	
489	,, 14	RR	,,	Emphysematous	..	..	..	..	[cultures Badly decomposed: no
488	,, 14	MM	,,	..	..	..	..	..	,, ,, ,, ‡
482	,, 18	J	,,	Emphysematous	Normal	Clear	..	Bacteria	
499	,, 22	X	,,	Hepatised	,,	..	..	..	No cultures §
500	,, 25	A	,,	,,	,,	..	..	Bacteria	
1	,, 25	..	,,	Hyperæmic	,,	..	..	..	No cultures
3	,, 29	FF	,,	,,	,,	Clear	Clear	Bacteria	
6	May 4	T	,,	,,	,,	,,	,,	,,	
7	,, 4	Q	Normal	,,	Peritonitis	,,	,,		
11	,, 16	QQ	Exudative pleuritis	Hepatised	,,	,,	,,	Bacteria	
12	,, 18	YY	,,	,,	Normal	..	..	..	No cultures
15	,, 19	N	,,	,,	,,	Clear	..	Bacteria	
20	,, 25	VV	Normal	Normal	Peritonitis	,,			
19	,, 26	III	Exudative pleuritis	Hepatised	Normal	..	..	..	No cultures
26	June 3	..	,,	Hyperæmic	Peritonitis	..	..	..	No cultures

* Normal indicates that no change was noticed in the microscopic examination. In many instances cover-glass preparations were made by drawing a cover over the peritoneum either on the abdominal wall, over the liver, or intestines. When stained they exhibit no bacteria.
† Non-motile, rabbit septicæmia bacteria. In cover-glass preparations from the exudate they exhibited the polar stain.
‡ Rabbit examined at station. The lesions were not noted in full on account of advanced decomposition. No cover-glass preparation from exudate.
§ In every case (except No. 488) where cultures were not made, the bacteria were demonstrated in stained cover-glass preparations from the exudates.

The first of the breeding rabbits to die were examined by Dr. Kilborne, who found extensive pleuritis. Subsequently the dead animals were brought to the laboratory, where they were carefully examined. As soon as the seriousness of the disease was realised, all of the rabbits were inspected, and those suspected* of having the disease were removed, and the pens thoroughly disinfected. By repeating the disinfection after each death and removing immediately all suspected rabbits, the outbreak was abated, but not until many deaths had occurred. About one-third of the rabbits that were affected with the rhinitis died in a short time, and a few of those that were isolated perished in the course of several weeks.

In the appended table is given a list of the rabbits that died from the breeding-pens, the pens in which they were kept (for relation of pens to each other see diagram), the gross lesions as found on *post mortem* examination, and the distribution of bacteria in the organs of the rabbits as indicated by the bacteriological examination. The fact should not be omitted, that in stained cover-glass preparations from the spleen, liver and blood no bacteria were found in any of the animals; while in similar preparations from the exudates, they were invariably present in large numbers, excepting in No. 488, in which no examination was made.

From the facts recorded in the table, it will be observed that the disease was practically identical in its manifestations in all of the rabbits examined. It will furthermore be noticed that the lesions were localised in every instance, and that, judging from this outbreak alone, the term septicæmia does not convey a correct idea of the nature of the disease. The specific organism, however, resembled so closely the germ which has been described as the bacillus of rabbit septicæmia, that little doubt can be entertained that it was an outbreak of that disease, in which the germ was attenuated to such a degree that it could no longer multiply in the blood and induce a general septicæmia. The localisation was very marked, and its similarity to attenuated swine-plague bacteria, in its preference for the serous membrane is exceedingly striking. The lesions were so uniformly constant that it seems unnecessary to record the individual *post mortem* notes, but simply to describe the symptoms and pathology as they were observed in the disease as a whole.

Symptoms.—The general manifestations of the disease were

* The only evidence of disease that could be found among the living animals was a mild or more severe rhinitis, and it was by that symptom that the rabbits were separated.

usually slight. In the beginning of the outbreak the disease was so insidious that many of the rabbits were not observed to have been ill. Upon closer observation it was found that only rabbits which were suffering from a rhinitis died, and, consequently, after the first few deaths the disease could usually be foretold by the nasal difficulty. An occasional peculiar snuffling sound, accompanied by shaking of the head and rubbing of the nose with the feet, was noticed in nearly all cases in which the rhinitis was marked. The nasal discharge was usually observed for from several days to a few weeks, without any noticeable effect upon the general health of the animal. For a day or two before death the rabbits ate sparingly, and sat in a somewhat crouched position.

Pathology.—The rabbits were not emaciated, excepting a few old females that were nursing young. The most characteristic lesion was an inflammation of the pleura or peritoneum, with the effusion of a small quantity of serum and the migration of round cells. The pleura was most often affected. Usually the pleural cavity contained a large quantity of cellular substance. The parietal pleura was covered with an exudate composed of fibrin cells and bacteria. In rabbit No. 6, the lungs were covered with a thin, grayish, membranous exudate, which was removed with difficulty. In ten cases the lungs were more or less hepatised. The others were hyperæmic with areas of collapse, excepting in No. 20, where they were normal, and Nos. 489 and 482, where there was marked emphysema. In all cases of hepatisation the dependent portion of the cephalic lobes were affected, and in most instances the dorsal portion of the principal lobes. Upon section the hepatised tissue presented a greyish (necrotic) appearance. The bronchioles were filled with a thick muco-purulent substance. The microscopical examination of sections of the lung tissue that were hardened in alcohol, showed the alveoli to be filled with round cells and the capillaries distended with blood. In the areas where the disease was more advanced, the cells were breaking down. The changes in the dependent portion of the cephalic lobes were invariably more advanced than the hepatisation elsewhere, excepting where the entire lung was necrotic.

The trachea contained more or less purulent substance, and the mucosa was deeply reddened. The larynx was usually nearly filled with muco-pus. The mucosa of the nares was thickened and opaque. In nearly every case the nasal cavities contained considerable muco-purulent substance. In Nos. 15, 20 and 26 there was exudative peritonitis with pleurisy, and

in Nos. 7 and 19 peritonitis only. The livers were invariably enlarged and reddened, due to hyperæmia. They contained a very large amount of pigment, which appeared in granules from 0·8 μ to 2·0 μ in diameter. It resembled in form the grains of gunpowder. The pigment was usually observed lying between the cells. In most cases the liver cells were more or less fatty. In stained sections (rabbits Nos. 476 and 15) the pigment showed as bluish particles, and the capillaries were distended with blood. The cell nuclei and interlobular tissue were not appreciably changed. The spleens were normal in size and colour. The kidneys were hyperæmic, and in most instances the tubular epithelium was granular. In stained sections (from rabbits Nos. 476 and 15) parenchymatous degeneration was more or less marked. The blood vessels were usually injected. There was no apparent thickening of the intertubular tissue. The bladder contained very little or no urine. The stomachs, as a rule, contained little food. There were no visible intestinal lesions. The lymphatics were apparently normal.

Bacteriological Examination.—The specific bacteria were demonstrated, as previously stated, in the pleural and peritoneal exudates, but never in cover-glass preparations from the various organs and blood. Cultures were made from nearly every animal that was in a suitable condition, and in every case those from the blood remained sterile, and in only two out of eleven cultures from the livers did the rabbit septicæmia bacteria develope. The bacteria were localised on the serous membranes, more especially the pleura. The cause of the lung infection will be apparent from the fact, which will be further discussed, that the bacteria presumably gained entrance to the pleural cavity through the bronchioles and air-cells. The power of the attenuated forms of the swine-plague group of bacteria to multiply on the serous membranes of rabbits has elsewhere* been brought out by one of us (V. A. M.), but in no other investigations or experiments have we found such a marked example of this property of bacteria as in this outbreak.

* Appendix. Special report on the cause and prevention of swine plague, Department of Agriculture, 1891.

(*To be continued.*)

Editorial.

ANTHRAX.

ANTHRAX would appear to be largely on the increase in this country, and is attracting a good deal of attention, not only because of the loss it is inflicting on cattle owners, but also owing to the deaths that have occurred among people through inoculation with the virus.

In some quarters attempts have been made to prove that this is a comparatively new disease in these islands, but such is not the fact; the student of Animal Plagues well knows that it is one of the oldest maladies recorded in pre-scientific English history, in which its existence can be clearly traced under various designations, and that it cannot be considered an exotic scourge imported from beyond the seas, though at times it may be so introduced. Its eradication will prove no easy task, as the wholesale slaughter of herds in which one or two cases have occurred will have no influence upon it, unless other measures of a more harassing and thorough character are adopted; indeed, the slaughter of unaffected animals is simply needless waste and will not, of itself, get rid of the infecting agent. In this respect it differs from the other diseases which yield to occision, and the old popular French adage, *Morte la bête, mort la venin*, does not hold good with regard to it, as the germ which occasions it retains its vitality apart from the animal body for a very long time when conditions are favourable. Few of the germ-produced diseases are of wider geographical range, and perhaps no animal disorder has been more attentively studied; indeed, it was in investigating the intimate nature of Anthrax that the very ancient hypothesis of contagious diseases being due to *Contagia viva*, was converted into an established fact; while with regard to its immediate cause—the *Bacillus anthracis*—perhaps the life history of no other micro-organism has been more thoroughly examined or its clinical and pathological actions more accurately determined.

In view of the increasing prevalence of the disease among the domesticated animals, and the lamentable loss of human life this prevalence entails, its prevention and extinction becomes a most important question for the agriculturist and veterinarian, no less than to the sanitarian. The disorder must be looked upon as incurable in animals, as it runs its course so rapidly in them, and its commencement is usually

so obscure, that death has either occurred or is about to ensue when the veterinary surgeon is called in. In the human subject a fatal termination is not so rapidly reached, and, as a rule, there are primary local manifestations which, if promptly met by thorough excision of the part and the administration of large doses of potassium iodide internally, afford timely warning and give good grounds for a favourable prognosis.

The whole of the tissues and fluids of the dead body must be looked upon as virulent, and therefore the greatest care must be exercised in dealing with them. Burying animals which have perished from Anthrax in ground which is presently or prospectively to be occupied by living creatures, cannot be considered by those who are acquainted with the history of the scourge to be a safe procedure, unless the dead bodies have been more or less destroyed by powerful chemical agents either before burial or on interment; and experience indicates that the only effective mode of ensuring safety is by cremation. It is a mistake to assume that because the bacillus is said to be ærobic, burial in the ground renders it non-effective. Innumerable instances of outbreaks and many experiments prove that the spores of the germ may remain in a latent condition in the soil, and become active under favouring conditions a long time after they are deposited there. The answer of the Minister of Agriculture to a question in the House of Commons, on September 18th, with regard to this point, was not correct, and is likely to mislead those who have to deal with Anthrax in animals if they accept his statement as well founded.

Cremation on the spot where the animals have died, or as near it as possible, is, as we have said, the only sure means of completely destroying the germs; and though this is considered by the authorities to be too troublesome and expensive, yet it is quite feasible, and certainly cannot be so expensive as destroying a whole herd of cattle when a case of Foot-and-mouth disease or contagious Pleuro-pneumonia is discovered in it. And it must be remembered that the ground in which Anthrax-stricken cattle have been buried must for years be considered tainted and dangerous, and should not be used for grazing purposes. In almost every locality in which Anthrax prevails, there is plenty of fuel to be obtained at small cost for cremating dead animals, and surely if the expense were even somewhat considerable, it should not be prohibitive of this, the only safe course, in view of the prospective risks and losses otherwise possible. In India, where fuel is

generally scarce, and therefore dear, cremation is always resorted to in dealing with Anthrax whenever circumstances permit. On every ground of expediency and safety, therefore, this measure should be insisted upon and carried out thoroughly. Nothing should be neglected in contending with such a disorder, the eradication of which will demand more skill and attention than any other contagious disease of animals yet taken in hand in this country, and compared with which the suppression of Foot-and-mouth disease and contagious Pleuro-pneumonia must be pronounced child's play.

CONTAGIOUS PLEURO-PNEUMONIA AND THE CANADIAN CATTLE TRADE.

A BLUE-BOOK was published lately, giving papers and correspondence relating to the landing in Great Britain from Canada of cattle affected with contagious pleuro-pneumonia. The correspondence was begun last November by the Colonial Office sending to the Board of Agriculture letters from the Acting High Commissioner for Canada with respect to the alleged cases of pleuro-pneumonia in the cargoes of the *Monkseaton* and the *Hurona*, begging to have the decision of the Government in the matter postponed until the return of Sir Charles Tupper, who was then in Paris conducting a commercial arrangement between Canada and France. On November 5th the Secretary to the Board of Agriculture wrote saying that the Board felt obliged to revoke the order by which Canadian animals had not hitherto been subject to slaughter at the port of landing. Then followed letters and telegrams begging that the time for revocation might be postponed. This the Board of Agriculture refused to grant. In February this year the Governor-General forwarded to the Colonial Office a report of the Committee of the Canadian Privy Council, made in January, setting forth that pleuro-pneumonia was unknown in the district whence the cattle in question were traced to have come, and suggesting that there must have been an error in the diagnosis. The report also called attention to the stringent restrictions enforced upon importation into Canada of cattle from the United States. Appended to the report was a long list of reports by veterinary surgeons showing that no pleuro-pneumonia existed in the districts inspected. The Board of Agriculture, being again pressed as to the revocation of the order, again refused to reconsider their decision. The result of this was that it was agreed that Canadian cattle should, when landed, be slaughtered in special slaughterhouses, and that the lungs of the animals should be examined in order to ascertain if any diseased animals were imported from Canada. In July the Board of Agriculture published the results of these investigations, and stated that for the time being it was impossible to be satisfied that reasonable security existed against the importation of diseased animals from Canada. The Canadian Government, in reply, produced reports made by Dr. Woodhead and Mr. Hunting on the lungs of some of the slaughtered animals, and these reports went to show that the disease found to exist in some of them was not contagious pleuro-pneumonia, but simple pneumonia. The correspondence concludes with the following two letters:—

"Victoria Chambers, 17, Victoria-street, London, S.W.,
"Aug. 4, 1893.

"Sir,—With reference to our previous correspondence on the subject of the Canadian cattle trade, I desire to call attention to the following remark made

by the President of the Board in his speech in the House of Commons last night :—

"'It was admitted by the authorities that disease existed in Canada, and that the animals which had come over here had got a disease.'

"I do not know what admission is referred to by Mr. Gardner, but I should like to say that I have never said anything to give rise to any impression that any contagious disease, especially contagious pleuro-pneumonia, had ever been known to exist in cattle in Canada, either in the past or at present. There is no doubt that Canadian animals are subject to ordinary non-contagious disease of the lungs, as animals are in every country, but this is a very different thing to stating or inferring that anything of the nature of contagious pleuro-pneumonia exists in the Dominion.

"I notice that some importance is being attached to the following statement in the letter from the Board of Agriculture to your Department, dated the 21st ult. :—

"'The Board cannot but think that the Canadian Government would have obtained valuable evidence if arrangements had been made for the slaughter and examination of the lungs of all animals rejected by the officers of the Dominion Government during the present season as unfit for shipment, and if, as has been stated, some of these animals came from the same district as other animals shipped by the *Lake Winnipeg*, the results would have been very material to the question at issue.'

"Immediately on receipt of the letter in question, I telegraphed as follows to the Minister of Agriculture of Canada :—

"'How many animals during present season were rejected by officers Dominion Government as unfit for shipment, and for what causes? Reply immediately.'

"The following answer has reached me:—

"'Animals rejected. No record kept. Reasons, chiefly big jaw, lameness, physical injuries, and in very few exceptional cases, tuberculosis.'

"I think this disposes very completely of the inference which seems to have got abroad that some of the rejected cattle had been suffering from contagious pleuro-pneumonia.

"I may say that some months ago I communicated to the Department some complaints that had been made to me of old and worn-out animals being shipped to this country. The following is an extract from my letter :—

"'I think it right to tell you that I have received complaints from Liverpool and Glasgow of old, worn-out animals having been sent over, which in any case were hardly fit for food, and hardly worth more than the expenses in connection with their transit. In view of the importance of the matter, I think every care should be taken to insure that none but good, healthy, suitable animals are sent over. Nothing should be done to prejudice our position in any way.'

"The above quotation serves to explain the increased vigilance of the veterinary officers of the Department of Agriculture in preventing the shipment of animals which would not meet with a ready sale in this country, and which might be injuriously affected by a sea-voyage in their condition at the time of embarcation.

"A few days ago the President of the Board stated that he had not received any formal invitation from the Canadian Government to send out veterinary surgeons to make inquiries as to the health of cattle in different parts of the Dominion. I now have the pleasure to quote a telegram I have just received from the Minister, which I hope will receive the consideration of her Majesty's Government :—

"'You are authorised to request the President of the Board of Agriculture to send two veterinary surgeons to investigate the question of the non-

existence of pleuro-pneumonia in Canada. This Department will defray expenses.'

"I am, etc.,

"CHARLES TUPPER.

"The Under-Secretary of State for the Colonies."

"Board of Agriculture, 4, Whitehall-place, S.W.,

"Aug. 15, 1893.

"Sir,—I have laid before the Board of Agriculture Mr. Fairfield's letters of the 29th ult. and 3rd inst., and Mr. Meade's letter of the 5th inst., with their respective inclosures, on the subject of the importation of certain diseased cattle from Canada.

"In reply, the Board direct me to inform you that they agree with the Secretary of State that these further communications ought to form part of the papers to be presented to Parliament, and the necessary arrangements will be made for this purpose.

"With regard to the purely scientific aspect of the case, I am to say that the letters and reports of Mr. Hunting and Dr. Woodhead have been fully considered by the veterinary advisers of the Board, but those officers see no reason to alter the opinion they have expressed as to the nature of the malady with which the diseased animals were affected. It was to be expected that, in a matter of such importance, some difference of expert opinion would manifest itself; but, in view of the fact that the three veterinary officers of this Department concur in declaring the disease to have been contagious pleuro-pneumonia, it must be obvious that it is impossible for the Board to act on any other assumption than that the animals in question were affected with contagious pleuro-pneumonia.

"Moreover, the declaration in question is, as the Board understand, in accordance with the opinion of three out of the four veterinarians who, in addition to Mr. Hunting, were afforded an opportunity of seeing the diseased portions of the lungs.

"It is to the future position of Canada under the Contagious Diseases (Animals) Acts that the principal importance now attaches, and the Board have already indicated some of the measures by means of which the Canadian Government could go far to secure evidence bearing materially on the question of the restoration of the privilege of free entry which they wish to obtain, and which the Board wish to be in a position to confer.

"It was with much regret that the Board read the High Commissioner's remarks as to the suggestions made by them under this head.

"The argument that the disease with which the animals recently landed were affected could not have been contagious pleuro-pneumonia, because that malady is not known to exist in Canada is only valid to the extent to which efficient measures are taken to secure information on the point, and *vivâ voce* inquiry and the external examination of animals, without slaughter in a single case, are clearly insufficient for the purpose if the nature and attributes of the disease are kept fully in mind.

"There is abundant evidence that contagious pleuro-pneumonia may remain dormant during a lengthened period, and it was stated in evidence given to the Departmental Committee of 1888 that cases had been known of the development of the disease after no less a period than 15 months. Where the disease is not indicated by any outward symptoms, a condition which is not at all uncommon, slaughter and examination of the lungs afford the only means of detecting it.

"Moreover, contagious pleuro-pneumonia in many cases does not manifest itself by clear and unmistakable external symptoms. The evidence placed before the Departmental Committee above referred to went to show that even veterinary surgeons in a large number of cases are unable to recognise

the disease either in the living animal or in the lungs after death, and this inability is, of course, even more common among those who have no veterinary knowledge at all.

"The fact, therefore, that the Canadian Government have at present no information as to the existence of the disease appears to the Board to be very far from conclusive, and in the interests of the trade of the two countries, and even of the health of live stock in the Dominion itself, the Board would venture to press most strongly upon the Canadian Government the adoption of vigorous and really efficient measures, such as those they have already indicated, in order to ascertain whether by any mischance the disease has obtained a footing in the Dominion. It is certain that the disease exists in the United States; the frontier between that country and Canada is a very long one, and of such a character as to make its protection difficult, and the possibility that disease may have been irregularly introduced across it undoubtedly exists.

"In this connection the Board would refer to the suggestion that officers appointed by the Board should visit Canada to make inquiries on the spot. The adoption of such a course would constitute a new departure, which would entirely reverse the past policy of the Board in such matters, and the Board would resort to it with great reluctance. Officers so employed could not, in the opinion of the Board, elicit a tithe of the information which the Canadian Government can themselves secure by means of officers acting under their own directions, if they will take the necessary steps for the purpose. Representatives of the Board would have no power to slaughter animals, a step which, as the Board have already indicated, is the only complete test of the existence of the disease, and even if such power could be conferred upon them, it would be impossible for two men, with no knowledge of the country, or official authority, to cover the ground and do the work in any reasonable period of time.

"The Board would wish, if possible, to accede to any suggestion made by the Canadian Government with a view to elicit further information as to the existence or non-existence of disease in the Dominion, but they believe that the adoption of this particular proposal would be futile for the purpose, and that this will be clearly seen on any attempt being made to formulate the precise nature of the instructions and powers to be given to the Board's representatives. At present, as I have said, the disposition of the Board is adverse to the proposition, but they will be happy to consider any definite suggestions as to the course which the inquiry should actually take.

"The Board note that the information asked for by them, *inter alia*, as to the analogous cases known to the Canadian Government will be furnished at once. Those cases were the subject of reference in a letter addressed to Professor Brown by Sir Charles Tupper, on the 7th of June last, in which he says:—'There is no question that the Canadian animal whose lungs you showed me was affected with some disease of a pneumonic character, and it is equally a matter upon which there can be no doubt that animals in various parts of the Dominion occasionally suffer from the same disease, whatever it may be, as other similar cases have come before us at very rare intervals in the last few years.'

"The cases to which Sir Charles Tupper thus refers must have been made the subject of close examination and investigation by the official veterinarians in Canada, and the Board attach great importance to the receipt of full particulars as to the circumstances attending the cases and the nature and results of the inquiries made respecting them.

"The Board have requested Professor Brown to embody in a formal report any further observations which he may wish to make on the scientific aspects of the question, and the Board will communicate this report to the Secretary

of State, but Mr. Gardner is anxious to fulfil his engagement to Parliament to lay papers on the subject on the table of the House at the earliest possible moment, and the Board therefore propose forthwith to present the papers already submitted semi-officially to Lord Ripon, together with the communications since received from your Department, and this reply.

"I am, &c.,

"T. H. ELLIOTT, Secretary.

"The Under-Secretary of State, &c., Colonial Office."

SERIOUS ANIMAL DISEASES IN AFRICA.

THE terrible disease which broke out about two years ago north of the Equator, and devastated the cattle herds of Eastern and Central Africa (says the *Morning Post*), appears to have attracted little notice in this country. Its dimensions and disastrous effects might have entitled it to the attention of those interested in cattle disease, and the Department of Agriculture, when Mr. Chaplin was at its head, did take some measures to obtain information on the subject. The indifference with which the matter was regarded arose, doubtless, from the fact that there was no cattle trade between Africa and Europe, and that no channel, therefore, existed by which the contagion could be introduced to Northern countries. This, however, is an assumption which goes too far. No cattle are imported from East Africa, it is true, but there is a considerable importation of hides; and, this being so, it would seem that there is a strong case for some action on the part of the Government, to obtain reliable information on the nature of the disease which has been decimating not merely the cattle, but the game of Eastern and Central Africa, and to obtain satisfactory assurances—if such assurances are warranted—that the germs of the disease cannot be imported by the hides. The plague, after devastating the equatorial regions, has reached Lake Nyassa in the South, and is evidently heading for the Cape.

Out of a total of 12,288 packages of hides exported from the port of Zanzibar during the year 1892, of the value of Rs.258,912, no less than 10,986 packages came to Europe, while America took 1,236 packages. London received 1,638 packages, Marseilles 220, Hamburg 8,215, and other European ports smaller quantities; New York and Boston received 1,236 between them. Of the large number shipped to Hamburg, probably the greater part was for transhipment to American or English ports. If, therefore, there is any ground for suspecting that the germs of the disease can be carried by the hides, a strong case arises for inquiry, and such action, as the results of competent inquiry may call for, in the interests of stock owners in England. It is almost superflous to say that cattle disease is a matter which calls for the closest and most anxious attention of our authorities, in whatever part of the world it makes its appearance, and no avenue by which it can possibly approach our shores should escape the strictest vigilance. Many kinds of cattle disease have been met with by travellers in Africa, more or less contagious and destructive in their effects. One or two may be mentioned by way of illustration, although it will be noticed that in incidence, as well as dimensions, they bear no comparison with the late plague in Central and East Africa, howsoever analogous they may appear in some other respects. Emin Pasha describes a plague which he witnessed in Latuka in 1881. "Although the abundance of game," he says, "is a blessing to the people, I attribute to it a fact which I could not previously explain; all cattle brought here, and riding animals, such as donkeys, mules, etc., are ruined after a short stay. Swellings on different parts of the body, loss of appetite, emaciation, and, finally, death follow one another speedily, a combination of symptoms

which I attribute to the intrusion of intestinal worms. This view is confirmed by the fact that all the game absolutely swarms with worms; this is always the case in countries where salt is rare." Dr. Schweinfurth observes a somewhat similar state of things among the cattle of the Dinka tribe, also in the White Nile regions. The continual dampness of the pasture, he says, especially during the rainy season, favours the development of revolting intestinal vermes, and rain-pools in dry months become most prolific as breeding places for cercariæ. Half the cattle in the country sickened and died with all sorts of intestinal disorders. Dr. Schweinfurth was, however, sure that, notwithstanding that these herds were wholly unaccustomed to salt, its use would infuse new life and vigour into them; he attributed the preservation of his own cow to the administration of salt to her regularly. Other forms of cattle disease are mentioned by him, but these cases, as well as that described by Emin Pasha, differ from the recent plague in one very important respect. They were confined to cattle and domestic animals only, whereas the latter has been equally fatal to such game as the buffalo, whose carcases travellers have found strewn over the country.

With regard to the East African plague, which may almost be said to have swept away every four-footed beast in the immense pastoral regions of the Somalis, Masai, and surrounding tribes, we have some particulars from intelligent witnesses, which may prove of interest. In May, 1891, Mr. Rogers, an officer of the East Africa Company, in charge of the district of Witu on the coast, in reporting the death of 17 of his bullocks, believed their deaths to have been "undoubtedly from the same disease that is carrying off thousands of heads of cattle in the Somali and Masai countries and elsewhere. Mr. Jackson," he adds, "informs me that he heard from Mr. Gedge that this same disease is raging in Lykipia, in the Masai country, where out of immense herds, only a few head are left." The symptoms of the disease are described as follows:—A bull leaves the camp at daybreak for grazing, apparently in perfect health, eats steadily for a couple of hours or so, and drinks water freely, when suddenly he may be seized with spasms; the limbs become rigid; the animal staggers and falls down; his breathing is very short, quick, and irregular; the entire body, especially the back and stomach, are very hot to the touch, and just before death blood drips from the mouth, nose, and ears, and water from the eyes. An animal thus seized generally dies in the course of half an hour, but sometimes gets over the first attack, moves about in a dazed state for a few hours, is then seized again with spasms, and dies. It was also noticed that since the disease had shown itself, the bullocks ate earth in large quantities, though they were freely supplied with salt. In no case did any animal, once seized, recover. Every known remedy was tried by Europeans and natives (East Indians), but without success. As an experiment, one animal, which was very bad, was given an enema of hot soap and water, and a draught of a pint of beer; though the animal was almost rigid at the time, it recovered, grazed freely, but died on the following day.

Though the symptoms of the disease were pronounced to resemble pneumonia, cold was not the cause, as all the animals were comfortably housed. A *post-mortem* examination was made upon two of the bullocks by a medical officer, who, however, did not profess to know anything of veterinary medicines, and described the appearances of the tissues as they appeared to him from his knowledge of human anatomy. It was his opinion that the disease was pneumonia in an epidemic form. In both cases on opening the chest the lungs only collapsed slightly, and there were no adhesions to the chest walls. In one the pleural cavities were dry, in the other they contained a considerable amount of fluid—the left containing more than the right. The lungs were heavy and solid to the touch throughout, pitting on pressure, when a frothy red serum oozed out. On section they cut like flesh, and in one case

large spots of a considerably darker colour than the rest were scattered over the surface, and these on being cut were more consolidated than the surrounding tissue. The heart was well contracted, and all the cavities contained dark clots of blood. The spleen was considerably enlarged.

In Zanzibar Island horses are subject to an epidemic, which has, it would appear, some relation to the cattle plague on the mainland. The disease is deadly not only to horses, but to every kind of herbivorous animals, to fowls, it is also said to fishes, and, what is still more important, to man. Dr. Charlesworth, the Consular medical officer at Zanzibar, has had numerous opportunities of studying this disease, and, in conjunction with the late Captain Fuchs, Austrian Consul, "determined without any doubt whatever," to quote his own words in a recent report, "that this disease is that variously known in England as anthrax, malignant pustule or splenic fever, in France as charbon, and in Germany as anthrax or milzbrand." As Dr. Charlesworth is of opinion that the tremendous visitation which lately devastated the mainland is the same disease, his remarks upon it are interesting. The most important symptoms he regards to be the preliminary ones, which may last from one to several days, during which the animal is sluggish, extremely depressed and feeble, loses its appetite, and would probably be found to have a very high temperature. This stage he regards as the most important, as it is the only one in which remedial measures have any chance of success. "The germ of anthrax," Dr. Charlesworth says, "undoubtedly exists in the grass in certain districts: when the land is once infected with these disease producers, drainage and cultivation appear to be the only means of getting rid of them. They appear to become much more numerous in wet and damp weather. It is important to point out that it is not the dampness of the grass that constitutes the danger, but the germs which accompany it." The most significant statement made by Dr. Charlesworth is that this fatal disease is not only highly contagious, but that grass is not the only means of conveying contagion—water, and everything that has come in contact with a diseased animal may do so. All carcases should be burned, as well as stable utensils, etc., and wood-flooring and other woodwork of stables. It appears somewhat doubtful whether any serious attempt is made by Arabs to take due precautions in such cases. It is even said that the slaughter of diseased animals is contrary to Mohammedan faith, or, at any rate the slaughtering of them in any way except in accordance with Mohammedan customs. In such an epidemic as that which has ravaged the mainland, and is now extending towards the Cape, precautionary measures are out of the question. But in view of the opinion of Dr. Charlesworth that the disease on the island and the mainland is the same, and that everything that has been in contact with a diseased animal will convey the contagion, it becomes a serious question how far it is safe to continue importing from the infected regions large quantities of hides, many of which may have been taken from diseased animals. There is, at any rate, a case for competent inquiry and investigation by an expert, and the Department of Agriculture might usefully give its early attention to the expediency of obtaining full and reliable information on the spot by a qualified veterinary surgeon. The time is past when we could afford to run risks.

"LOUPING ILL" IN SHEEP.

Mr. E. G. Wheeler, agent to the Duke of Northumberland, has published the following information with regard to this peculiar ovine disease:—

Owing to the serious ravages caused by the very fatal disease in sheep locally known as "louping ill," I was desired by his Grace the Duke of Northumberland to make arrangements for a pathological investigation, of the best

and most thorough character possible, in the hope that by this means the complaint might be better understood, and that some means of prevention, if not cure, might be suggested for the benefit of the duke's tenantry.

Fortunately, his Grace was able to obtain the services of Dr. Klein, F.R.S., whose very thorough and able pathological researches are so well known, and to whom the public are indebted for the discovery of the cause of the grouse disease, and of fowl enteritis ("Grouse Disease," Macmillan & Co., 1891).

Immediately on the "louping ill" making its usual annual appearance on the duke's farms in May last, Dr. Klein came to Kielder Castle to conduct his investigations, where he received every assistance from those in the neighbourhood, and was specially beholden to Mr. Walter Hedley, of Bewshaugh, not only for his personal assistance, but also for kindly placing his buildings at his disposal for making *post-mortem* examinations.

The following is an epitome of Dr. Klein's very full and exhaustive report, with his recommendations as to the best means of reducing the mortality occasioned by it:

Nature of the Disease.

As is well known, the chief and most conspicuous symptom is contraction of the muscles of the neck and limbs, and ultimately loss of movement of the limbs altogether. During the earlier stages of the disease these symptoms generally repeat themselves in paroxysms, in which the animals show actual or intended jumping movements, hence the popular name of "louping ill." With the first onset of the disease the animal is quiet, does not feed, and separates from the rest; it shows loss of muscular power, and at times trembling and cramp either of one limb or another, or of the extensors of the head. Soon, probably the next day, this is much accentuated, the animal shows worse paroxysms of cramp, and has less control over its limbs when attempting to walk. It is at such times the symptom of "louping" or jumping becomes apparent.

Either on the same or the next day, the animal is almost or altogether unable to move its limbs, and therefore remains lying for long periods on its side, though at the same time it is able to take notice of everything that is going on around it, and to take food.

Death generally supervenes rapidly when this stage is reached—within a few hours or a day—often before it is expected, since it is not unusual that animals supposed to be only slightly affected, or even on the mend over night, are found dead next morning.

Among less conspicuous symptoms, affected animals not unfrequently have a rapid beat of the heart, rapid—sometimes laboured—respiration and rise of temperature.

Dr. Klein made *post-mortem* examinations of seventeen animals, eleven sheep and six lambs; few of these died a natural death, the majority were killed, some in the earlier, some in the later stages of the illness.

Post-Mortem Appearances.

For the particulars in detail of the *post-mortem* appearances, Dr. Klein's full report (which will be given in the next number of the Royal Agricultural Society's Journal) must be referred to. For the purpose of the present letter it will be sufficient to refer to them very shortly.

1. The constant and most conspicuous feature is invariable congestion at the base of the brain and medulla.

This congestion of the vessels is, however, limited chiefly to the surface, the cerebral and medullary substance itself not showing anything abnormal in these respects.

2. After the earlier stages of the disease the lungs are found to be in a congested and consolidated condition.

3. A further important change is noticeable in the heart. In sheep the congestion is always present, except in the earlier phases, but in lambs only to a smaller extent and only in the latter stages of the disease.

There seems little abnormal in the liver, spleen, stomach, or kidneys, and the blood is normal in its appearance and coagulability.

Dr. Klein considers that of all the appearances described above, those affecting the brain and medulla could alone account for the symptoms observed during life, and for the fatal issue. And the question arises—What causes this congestion? Or, in other words,

What is the Cause of the Disease?

There are several points well established, which point to the malady belonging to the class of infectious disorders.

1st. The disease has a seasonal and local epidemic character, commencing generally in April, and continuing into the month of June. In this respect its similarity to certain infectious diseases in man and animals—such as cholera and grouse disease—is striking.

With regard also to its preference for certain localities "louping ill" partakes of the character of infectious disease. It appears to be known only in certain districts in the North of England and Scotland, and even where it prevails, is so local, that a fence between one sheep farm and the next is often the boundary between infected and uninfected areas. The same fundamentally important local predilection forms a conspicuous feature in some other infectious diseases.

2nd. It is clear that the cause of the disease is to be found in the soil. A proof of this is the well-established fact that a new flock of sheep introduced on to an infected area will suffer from the disease in the following spring, and as a rule far more severely than the old stock.

Infectious diseases having similar characteristics are not rare. Thus in the cases of both anthrax in animals and malarial fever in man (ague) the "contagium" of the disease is received into the body by the digestive or respiratory organs.

The Source of Infection.

With regard to "louping ill," it is the almost universal custom when an animal dies for its carcase to be left to rot away on the moors till it disappears. Supposing that, as in other infectious diseases, the body of the dead animal contains the "contagium" in an enormous crop of the specific microbes, it is obvious that if it is allowed to remain unburied or unburned during the dissolution of the carcase numbers of the microbes have an opportunity of becoming scattered and distributed over the soil, to remain there ready for new mischief when the favourable time (the spring season) and opportunity (an animal susceptible to the disease) offer themselves.

Conditions like these would readily account for the soil of one locality retaining the source of infection with great persistence, whereas a neighbouring locality remains free year after year, providing the microbe is not introduced upon it.

"*White Tick.*"

There exists a strong, if not universal, opinion that the disease is caused by a "tick," locally known as the "white tick," as opposed to the ordinary black sheep tick, and this is based on the following assertions:—That this tick is present where the disease occurs, and is absent where the disease is unknown.

That it is found concurrently with the disease there can be no doubt, but that it is invariably absent where there is no disease, or invariably present where there is disease, are conclusions that Dr. Klein will not at present admit, and he adds: "My doubts will, I am afraid, not grow less strong, the

greater the confidence with which the assertion is put forth, unless it is set at rest by a thorough examination into the question, made by a zoologist well qualified to give an opinion."

His doubts are based on the following remarkable facts :—

That it seems inconceivable that an insect possessed of such powers of locomotion as the tick should be present on one farm which is subject to "louping ill," and should be excluded from the next, which is free from disease, the only boundary being a wire or loose stone fence.

That the tick is undoubtedly present on many sheep which have not got the disease ; and that though cattle sometimes take the disease they are not infected by the white tick. That this tick should be the primary cause of the disease under such circumstances seems impossible of acceptance, and there is certainly nothing in the whole range of pathology that would offer a simile to such remarkable conditions.

So far as Dr. Klein could see these ticks seemed merely to suck the blood, and produced locally no more—in fact less—injury than many other well-known parasites. The undoubted fact, however, mentioned above, and admitted on all sides, viz., that this tick is found in the skin of animals that are and remain free of "louping ill," seems finally to dispose of the theory that the tick is the real and proximate cause of the disease. This would still leave open the possibility of the tick being the carrier of infection, inasmuch as it might carry the virus from the soil to the body of the sheep, which by its bite it might inoculate ; but this theory, it must be confessed, is somewhat remote.

Communication of Disease.

The disease is apparently communicable from one animal to another. It is well known that if a ewe contracts the disease, her lamb also does so, with few exceptions ; but the lamb may have it without its dam taking it. The explanation is evidently that the lamb always follows and is in close relationship to the ewe. One of the first signs of illness is that the animal is dull and separates from the rest. If this happens to be a ewe, the lamb remains with her, and, therefore, if the disease be infectious, it is to be expected that sooner or later the lamb would take it from its mother. But the reverse would not be the case, as we should find one of two things happen : either the lamb being ill would not or could not follow its mother, who consequently would not be so much exposed to infection ; or, owing to the apparent neglect of the dam, and for other reasons, the shepherd would remove the lamb, and take it into a shed to nurse it.

These facts taken together, strongly point to the disease being communicable from animal to animal.

How to Stamp out the Epizooty.

Another phenomenon seems worth mentioning, though it may have been purely accidental, or owing to the exceptionally fine and dry spring weather of the present year, which is that whereas the disease appeared at Kielder at about its usual time, viz., the third week in April, and though the climax is usually not reached before the middle of May, yet by the 10th of that month, few, if any, cases could be obtained for examination, and the epidemic had practically ceased. Now this year, for the first time, every smitten animal was at once separated in the neighbourhood, and brought in for examination, and thus ceased to be a focus for further infection for others, and it appears probable that this may have had a material effect in stamping out the epidemic. At any rate Dr. Klein is strongly of opinion that it is in this direction that action should be taken, viz., that as soon as a sheep is affected it should be at once separated from the rest, and kept carefully isolated in a paddock for the purpose. No harm could be done, and it is hoped that it may be the cause of

largely diminishing the number of cases. It could not do away with the disease, the cause of which in the first case is in the soil, but it may limit the infection being subsequently communicated to others.

The two conditions, viz., the contraction of the disease in the first instance, by contagion present, or left in or on the soil by a previous epidemic, and the subsequent spread of the disease from an infected animal to others, are well known to occur in other infectious disorders, both of men and animals.

All these considerations point to the conclusion that "louping ill" is to be classed among infectious or communicable diseases. There can be no doubt that if it can be shown that the growth and multiplication, with an affected animal, of a particular microbe is intimately associated with the disease; if, further, this microbe can be artificially cultivated, and, with a particle of such a cultivation, or the morbid matter from which it is derived, the same disease can, by inoculation, by ingestion, or by inhalation, be reproduced in a susceptible animal, with the multiplication in this experimental animal of the specific microbe—then proof has been established that such disease is of the order of infectious diseases, and is caused by that particular microbe. In the case of such disease the early isolation and removal, and the careful destruction of the affected animals, is the surest means of the prevention and spread of the disease. Though this series of proofs is desirable before the problem can be said to be satisfactorily solved, it is not always possible to obtain it. In some of the well-known communicable diseases, such as small-pox of sheep, small-pox of man, hydrophobia or rabies, and others, though these belong to the best-known communicable diseases, the specific microbe has hitherto eluded discovery. Some of the ablest pathologists have in vain searched for it, yet, we may take it as a fact that, like other infectious diseases in man and animals, in which the search has been successful, such as anthrax of sheep and cattle, tuberculosis, swine fever, grouse disease, and a host of others, these diseases must be caused by living, self-multiplying microbes.

Dr. Klein's Report.

For the description of Dr. Klein's pathological investigations of the "louping ill," recourse must be had to his report; but it may be stated shortly that he obtained positive results in six out of the seventeen cases he investigated. In each of the six the same microbe was present, but an attempt to communicate the disease by means of this microbe to two healthy lambs was not successful. There is, however, doubtless room for further investigation in this direction for the final and entire solution of the question, towards the elucidation of which there is no doubt Dr. Klein's able and carefully considered report will be most valuable.

When it is considered that the size of the microbe or bacillus is only about 1-25,000th part of an inch, it may be conceived the prodigious myriads which are contained in the carcase of one dead sheep, and the large risk of infection occasioned by their being spread over the ground by rain and other agencies; and it is sincerely to be hoped that farmers and shepherds will, for their own sakes, give Dr. Klein's suggestion a full and fair trial—viz., to isolate all affected cases, and to at once destroy and bury or burn all carcases of animals which have died of the disease. Should this course have the hoped-for result, "louping ill" may ere long cease to be the terrible scourge it has so long been in the districts where it is prevalent.

THE CHEMICAL ASPECTS OF BACTERIOLOGY.

At the meeting of the British Association, held at Nottingham during the first half of September, in the section devoted to Chemistry and Mineralogy, Professor Frankland opened a discussion on the present position of bacteriology, more especially in its relation to chemistry.

Bacteriology, he said, although originally an offshoot of botany, received its great impulse from the association with chemistry which began with the researches of Pasteur, whilst the greater part of our more recent knowledge was due to the labours of those medical men who had followed in the steps of Koch and his pupils. The progress that has been made of late years in this line of research was mainly due to the methods of producing pure and selective cultivations. These methods did not at present seem capable of any great modification, and a knowledge of them might be regarded as essential in a really liberal education. Pure cultivations of yeasts were now articles of commerce, and pure cultivations of microbes for purposes of research could be obtained in the same manner as pure chemicals. Bacteria, whose properties had been modified by successive cultivations, are also supplied in quantities for the preventive inoculation of cattle. Later work had shown that the differentiation of even the most carefully studied bacteria, such as those of cholera and typhoid, was very difficult, and the morphological characteristics which were originally employed almost exclusively had given way to chemical and pathogenic tests. One of the same bacterium under varying conditions will show greater variations in appearance than are shown by different species. Amongst the researches most important from a practical point of view were those of the Danish chemist, Hansen, on pure cultivations of yeast, which hitherto had been less valued in this country than on the Continent and in America. Pure yeasts were used in eighteen breweries in Europe, but not by one in England. This was probably due to the fact that until recently the pure yeasts were not capable of producing the after-fermentation which was required in the English methods of brewing, but since this drawback had been removed by Van Laer, it is probable that they will come into use, and some experiments have already been made at Burton-on-Trent by Mr. Horace Brown. The fermentations produced by bacteria, as distinct from those produced by yeasts, were of constantly increasing importance, and had afforded means of splitting up certain compounds and isolating new products that could not be obtained in any other way. The compounds fermentable in this way belonged to a very few chemical groups, and the products of the change were few in number, and comparatively simple in character. It would seem that whilst the same compound might yield different products when acted upon by different organisms, one and the same organism would yield the same products, even when it acted on substances of very different composition. Moulds differed from bacteria in their action, and produced an oxidation or burning up instead of fermentation. By reason of their selective action, and their tendency to attack certain compounds in preference to others present in the same liquid, bacteria enabled us to separate substances of identical chemical composition, but different physical properties, which could not yet be separated in any other way. The characteristics of a particular organism could be greatly modified by successive cultivations under special conditions. The dangerous and virulent anthrax bacillus could be obtained in a form that would not produce spores, and yeast could also be deprived of its spore-producing power. Successive cultivations in suitable media would greatly reduce the virility of many bacteria, and this fact was utilized in the production of the cultivations that were used for preventive inoculations. On the other hand, the poisonous effect of such active bacteria as those of typhoid and cholera, could be intensified by passing them repeatedly through the bodies of animals that at first offered great resistance to their pathogenic action. At the same time, this increase in toxic effect could not be produced by artificial cultivations, and it had not been found possible to convert a harmless organism into a pathogenic one. Examination of the manner in which bacteria occurred in nature shows the natural conditions produce changes similar to those resulting from artificial cultivation, and the chief pathogenic organisms were found

associated with others that were very similar to them in almost every respect, except that they had no pathogenic action at all, or only in a greatly reduced form. The anthrax bacillus in soil was accompanied by a modification so feeble in pathogenic effect, that it could be used for the preventive inoculation of dogs, whilst the bacteria of typhoid and diphtheria were almost always accompanied by varieties of similar appearance, but of greatly reduced virility. Further, it was possible, by proper cultivation, to so educate and train a bacterium, as it were, that it would attack compounds on which, in its original state, it had no effect. In connection with the relation between bacteriology and public health, Professor Frankland referred to investigations of himself and others on the purification of drinking waters by subsidence, filtration, and precipitation. He pointed out that great misconception prevailed as to the real value of water analysis, the object of which was to show whether a water was liable to become a source of danger at any time, and not whether it was actually dangerous at a particular moment. Recent methods had, however, made it possible to detect the special bacteria of typhoid and cholera when present in a drinking water. Contrary to the common belief, bacteria could retain their vitality in ordinary water for weeks, whilst the spores were not destroyed for months, but different species varied in this respect. Sewage was best treated by intermittent filtration through soil. This process removed the bacteria more rapidly and completely than it removed dissolved organic matter. Later investigations had confirmed the early observations of Downes and Blount on the susceptibility of bacteria to the action of light, and it appeared that the well-known disinfecting power of the sun's rays was due to the fact that they actually destroyed bacteria and their spores, the rate of destruction depending on the nature of the organism, and the condition in which it was placed. As bacteriology progressed, it encroached more and more on the domain of the chemist, and a profound knowledge of chemistry was becoming indispensable in researches on bacteria. The experimental training of the chemist especially fitted him for such work; but it was essential that he should also acquire some knowledge of biology.

Professor BURDON SANDERSON rejoiced in the great development of bacteriology from the chemical side, and pointed out that, whilst not in itself a separate science, it was the application to special ends of the three sciences—chemistry, morphology, and pathology, and for further progress it was essential that these three sciences should work together. He advocated the formation of an institute of preventive medicine under the direction of a chemist, aided by a morphologist and a pathologist.

Mr. R. WARINGTON read a paper on the three bacteria that were found in soils, namely, one that has the power of producing nitrites, another that produced nitrates, and a third, only recently discovered, that had the power of absorbing nitrogen from the air. It was the latter which produced the enrichment in nitrogen of soils, on which leguminous crops were grown.

INTERNATIONAL VETERINARY CONGRESS AT CHICAGO, UNITED STATES OF AMERICA.

A DETAILED programme of the arrangements for this congress has now been issued, and it appears to be decided that the meeting will occupy five days—commencing on the 16th and terminating on the 20th of October. The first is apparently to be chiefly devoted to the business of the United States Veterinary Medical Association, which has undertaken the organisation and arrangements for the congress. On the 17th reports will be presented on various subjects, and two papers will be read—one, on the Millet Disease of Horses, by Mr. T. D. Hinebauch, and the other, on the Picton Cattle Disease, by Mr. Johnston; the 18th will be devoted to discussion of reports of

Committees, a reception by the Western Veterinarians on the lake, and the reading of a paper on "Fistulæ," by Mr. Reynolds, and another, on a "New Method of Treating Periodic Ophthalmia by Surgical Interference," by Mr. Harrison; on the 19th the subject of "Veterinary Education" will be introduced by Dr. Liautard and discussed, as well as papers read on "Swine Plague and Hog Cholera" by Messrs. Welsh and Clement, and "Has Contagious Pleuro-pneumonia been entirely eradicated from the United States?" by Mr. Gadsden; and on the 20th Dr. Salmon will introduce for special consideration the subject of "Animal Food" from a sanitary point of view, and the Tuberculosis Committee will bring before the congress the important topic of "Tuberculosis," with reference to its nature, extent, and eradication—which will also be discussed. The congress terminates with a banquet on the evening of the 20th.

It will be seen from the above programme that the congress will have abundant occupation if the whole of the business is carried out. The work will be interesting and varied, as it includes subjects of great diversity and importance. We can only repeat the hope we have already expressed, that British Veterinarians will be represented.

It may be mentioned that a number of names of veterinary surgeons in different countries will be submitted for approval as honorary members of the congress; among them is the name of Professor Wehenkel, late director of the Brussels Veterinary School, who has been dead some years, but this is probably an oversight; and among the countries from which these honorary members have been selected, there is no mention of Canada, though it has two veterinary schools, presided over by very competent teachers, and has a large number of able practitioners scattered over its immense area. This omission is to be regretted for several reasons.

THE NATURAL TRANSMISSION OF SHEEP-POX TO HORSES.

In the *Œsterreichische Monatschrift für Thierheilkunde* for December, 1892, Veterinary-Surgeon Berger, of Slawuta, draws attention to the fact that there is no record of variola ovina being transmitted naturally to the horse. Dieckerhoff certainly states that horses may contract variola ovina and vaccina by inoculation, but he does not mention their natural transmission; while Friedberger and Fröhner assert that variola ovina may be conveyed either spontaneously or by inoculation to bovine animals, and even to man, but they make no allusion to its communicability to horses. Berger has observed the evolution of sheep-pox in fifteen horses, the attack being chiefly localised on the conjunctivæ and skin of the limbs. These horses were kept quite close to an open sheepfold in which sheep affected with variola were kept, and it is surmised that by means of the wind the virus was carried from the infected locality to the horses; though, on the other hand, it should be stated that the horses, in order to obtain water had to pass along a muddy road which was also traversed by the sheep, and the irritant action of the mud on the skin may have prepared the latter for the reception of the variolic virus.

DUBLIN SLAUGHTERHOUSES.

In Dublin the Public Health Committee has decided to recommend the Corporation to close all private slaughterhouses in the city, owing to the fact that tuberculosis has been found in some of the animals killed in these places. Of course there has been an indignation meeting of the victuallers, who declare that the very reasonable recommendation is simply meant to increase the income of the public abattoir, and they boast that they will beat the Corporation in the struggle. That body has not earned a character for stiff-

backedness, and it is quite probable that the prophecy of the victuallers will prove to be right. The owners of the dairy yards—those centres of shocking uncleanness in Dublin—have managed thus far to hold their ground, and they have set an example which will be of use to the butchers. If the Corporation desires to better its reputation it will take the opportunity now. Private slaughterhouses are a public nuisance, and there is in Dublin no reason for their existence, when a well-equipped public abattoir is available.—*British Medical Journal.*

Army Veterinary Department.

Gazette, September 11th.

Veterinary-Major C. W. Gillard is placed on temporary half-pay on account of ill-health. The following Veterinary-Lieutenants to be Veterinary-Captains: A. F. Appleton, E. H. Hazelton, F.R.C.V.S., L. J. Blenkinsop.

The undermentioned veterinary officers embarked for a tour of service in India, as under:—

On H.M.S. "Serapis" on the 6th September, Veterinary-Lieutenants H. M. Maxwell, E. E. Martin, H. T. Sawyer, and W. N. Wright.

On H.M.S. "Malabar" on the 14th September, Veterinary-Lieutenants H. P. Knight, J. Farmer, A. Smith, G. M. Williams and A. E. Clarke.

Veterinary-Lieutenant E. Taylor has been transferred from the Indian to the Home Establishment, and posted to the 6th Dragoon Guards, York, for duty.

Veterinary-Lieutenant R. W. Raymond, on return from South Africa, has been posted to the 8th Hussars, Hounslow, for duty.

Veterinary-Lieutenant W. A. McDougall has been transferred from Aldershot to Newbridge, for duty.

The annual statistical and general report of the Department for the year ending March 31st, 1893, has been issued, and shows, as usual, a satisfactory condition of army horses at home, in Egypt and South Africa, the establishment of which, when the report was prepared, was 13,285 troop horses, 203 mules, and 1,907 officers' chargers. The amount of inefficiency among the horses and mules was 63·44 per cent. of the average strength, being 7·58 per cent. less than the previous year, though the mortality was slightly higher, 2·13 per cent. of the strength. Of the latter, 1·23 per cent. died, and ·9 per cent. was destroyed. There were no cases of glanders-farcy reported during the year, this exceptional condition being now of some years' duration. In Egypt the admissions were greater than in the previous year, and there were no cases of glanders-farcy: in South Africa the state of the animals also appears to have been good, though 14 horses died from horse sickness, and glanders-farcy does not appear in the report. The officers' and farriers' classes at Aldershot were well attended, and the Army Vaccine Institute, under the management of Veterinary-Major Longhurst and Veterinary-Lieutenant Butler, furnished lymph sufficient to inoculate 43,425 people, material having been issued during the year for 43,442 people. The increase of establishment of the Department, due to the establishment of the Indian Civil Veterinary Department, and to a greater number of horses being maintained in that country, is noted.

Obituary.

THE following deaths have been reported:—

G. Brame, Rothwell, Leeds, who became a member of the R.C.V.S. in 1892;

W. Lodge, M.R.C.V.S., who graduated in 1875; and

J. T. Thompson, F.R.C.V.S., Sheffield, who graduated in 1862, and became a Fellow in 1885.

Many of the members of the Examining Board of the Royal College of Veterinary Surgeons, as well as a number of recent graduates, will hear with regret of the death, on September 11th, of Charles W. Heaton, Lecturer on Chemistry at Charing Cross Hospital, and lately an Examiner on Chemistry for the R.C.V.S. Mr. Heaton was an excellent examiner in every sense of the word, and his genial manner gained him many friends in the profession with which he had been more or less connected for a number of years. He became lecturer at Charing Cross Hospital, in succession to the late Professor Tuson, in 1862, when the latter was appointed teacher in chemistry at the Royal Veterinary College, where Mr. Heaton had been assistant and demonstrator for some time. He had previously successfully taught chemistry at the Repton School, Tunbridge Grammar School, and the Royal Benevolent College, Epsom, and was an Examiner in the same subject to the Royal College of Physicians, as well as Lecturer on Chemistry in the London School of Medicine for Women; he was likewise treasurer to the Society of Public Analysts, and Public Analyst to the parish of St. Martin-in-the-Fields. For many years he was a frequent contributor to chemical and medical literature, and in various ways did much for chemical science and the public welfare. He was fifty-eight years of age when he died.

La Clinica Veterinaria for August 30th announces the death of one of the most distinguished pathologists Italy has produced, Sebastiano Rivolta, who succumbed to disease of the heart at Turin on the 14th of that month.

Rivolta was born in a suburb of Alessandria in 1832, and entered the Turin Veterinary School in 1852, obtaining his diploma with distinction in 1856. For some years he practised veterinary medicine, until, in 1861, Count Ercolani, then professor in, and director of, the Turin School, had him appointed assistant teacher of clinical medicine. Within a year, after undergoing the necessary test with great credit, he succeeded to the chair of medical pathology. On the chair of general pathology and pathological anatomy becoming vacant by the transfer of Count Ercolani to the University of Bologna, Rivolta was designated by the teaching staff as his successor, and the Government appointed him an extraordinary professor in 1864; in 1868 he was made an ordinary professor. In 1871, when the Veterinary School at Pisa was completely reorganised, the academic council of the university of that city selected Rivolta to fill the chair of general pathology and pathological anatomy, a position he held up to the time of his death.

He was a great worker, an indefatigable investigator, and a "scienziato" of the first order, and he has left deep and indelible imprints in the annals of pathology, as well as in pathological anatomy. His publications are very numerous, and commenced with his entrance into practice. During the ten years he was at the Turin School he occupied himself chiefly with normal and pathological history, and in describing morbid specimens. During this period he commenced his important and classical work, "Dei Parassiti Vegetali," which was completed in 1873; to this he contributed many personal observations, which he illustrated by ingenious arguments. In the twenty years he was located at the Pisa school he laboured energetically and fruitfully; besides the large work he produced in conjunction with Professor Delprato, "L'Ornitoiatria," in 1880, he enriched science with many observations and new facts, especially in the domains of parasitology and bacteriology.

Professor Lanzillotti-Buonsanti justly observes that the name of Rivolta is indissolubly linked with science. "In molti lavori i futuri ricercatori dovranno necessariamente prendre le mosse dalle osservazioni da lui lasciate."

Parliamentary Intelligence.

HOUSE OF LORDS, August 24th.

SWINE FEVER BILL.

Lord RIBBLESDALE moved the second reading of the Contagious Diseases (Animals) (Swine Fever) Bill, which has come up from the Commons. He explained that the Bill was based on the recommendation of a strong Departmental Committee appointed by the President of the Board of Agriculture. The Committee, after hearing evidence, found that, owing to the impossibility of securing uniform action on the part of local authorities, swine fever could not be extirpated unless under the direction of a central authority, and they added that overwhelming evidence had been adduced to the effect that, by the adoption of proper measures, the disease could be extinguished in a reasonable time. The Bill made any money available for dealing with pleuro-pneumonia under the Act of 1890 available also for dealing with swine fever, and all the powers exercisable by the Board of Agriculture and the Lord Lieutenant and Privy Council in Ireland under that Act with respect to pleuro-pneumonia and cattle were made exercisable with respect to swine fever and swine. The compensation to be paid for any animal slaughtered under the provisions of the Bill was to be the value of the animal immediately before it was slaughtered, or, in the case of a diseased animal, one-half of the value of the animal before it became affected. With regard to finance, the Government anticipated that the money already standing to the credit of the pleuro-pneumonia account, together with a small balance of about £9,000 which remained of the moneys voted for foot-and-mouth, and the sum of £65,000 already provided in the estimates for the present year, would very nearly, if not quite, enable them to defray the cost of the administration of the Bill up to March 31st next, the end of the present financial year. In future years the net contribution of the Exchequer would be limited to £50,000, and the balance, after crediting the fund with the proceeds of the sale of carcases, would fall to be provided, as in the case of pleuro-pneumonia, out of the local taxation accounts in Great Britain and the general cattle diseases fund in Ireland. The Bill was to come into operation on November 1st next. The noble lord concluded by moving the second reading of the Bill. The Bill was read a second time, and subsequently passed.

HOUSE OF COMMONS, September 1st.

GLANDERS IN SCOTLAND.

Sir H. MAXWELL asked the President of the Board of Agriculture, in the House of Commons, whether he had any information of repeated outbreaks of glanders among horses in the county of Wigtown, and whether in each case the disease had been traced to the horses of a certain dealer in South Ayrshire, the local authority of which county had repudiated all responsibility in the matter; and whether he would cause stringent inquiry to be made in order to bring to an end such a serious state of affairs?

Mr. GARDNER, replying, said: I am sorry to say that it is the case that several outbreaks of glanders have occurred in Wigtownshire during the period named in the question. It has been stated by the Wigtownshire County Council that the disease was introduced into that county from Ballantrae, in Ayrshire, but I am informed by the Ayrshire County Council that the disease originated in Wigtownshire. I have no authority to determine the question at issue between the two councils, nor would there, in my opinion, be any advantage in my doing so. What is requisite is that both local authorities should take active measures against the disease wherever it

may appear in their respective counties, and I have no reason to suppose that there is any disinclination on the part of either of them to do so.

Sir H. MAXWELL: Will the right hon. gentleman undertake such a stringent inquiry as I suggest?

Mr. GARDNER: Under the Glanders Order issued last year, the duty devolves on the local authorities to administer that order, and I see no reason to interfere in the matter.

Sir H. MAXWELL: Suppose the local authorities fail to do their duty?

Mr. GARDNER: If it was represented to me that they had failed to do their duty, it might be for the Board of Agriculture to step in, but in the meantime it is for me to hear what the local authorities have to say in the matter.

September 9th.

THE HEALTH CONDITION OF CANADIAN CATTLE.

In Committee of Supply Dr. FARQUHARSON called attention to the doubt which existed as to the nature of the disease which affected Canadian cattle. He would like the doubt to be removed, and regretted that that the invitation of the Canadian Government to send out two experts to investigate the question had not been accepted.

Mr. T. H. BOLTON and COLONEL NOLAN supported the view taken by Dr. Farquharson.

Mr. GARDNER, in his reply to various questioners on subjects coming under the vote to complete the sum of £50,359 for the Board of Agriculture, dealt shortly with the matter raised by the above-mentioned hon. members, and said that the Committee had in no way shut the door against the due investigation of the disease affecting Canadian cattle.

September 11th.

ANTHRAX AND SWINE FEVER.

On the vote for the Board of Agriculture in the report of Supply, Captain NAYLOR-LEYLAND said there were two diseases increasing every year—anthrax and swine fever—and the House ought to know if the Government were prepared to deal with them.

Mr. GARDNER said he had issued a circular with regard to anthrax which he believed would meet the views of the hon. gentleman.

With regard to this disease a question was asked by Mr. JEFFREYS on Tuesday, who wished to know if there had been any fresh attacks of anthrax in the United Kingdom, and what steps had been taken to arrest its spread.

Mr. H. GLADSTONE said that the number of fresh attacks reported during the three weeks ending the 2nd inst. had been 11, 18, and 13 respectively. The business of enforcing the provisions of the law respecting anthrax rested with the various local authorities under the Contagious Diseases (Animals) Act. A circular letter had, however, been addressed to those authorities advising them as to the nature of the disease and the best means of arresting its spread.

September 12th.

ANTHRAX.

Mr. JEFFREYS asked the President of the Board of Agriculture if there had been any fresh attacks of anthrax in the United Kingdom; and what steps he was taking to suppress this dangerous and infectious disease.

Mr. H. GLADSTONE, who answered the question, said: The number of outbreaks of anthrax reported during the three weeks ending the 2nd inst. have been 11, 18, and 13 respectively. The business of enforcing the provisions of the law and the orders issued thereunder rests, in the case of anthrax, not with the Board of Agriculture, but with the various local

authorities under the Contagious Diseases (Animals) Acts. I have, however, addressed a circular letter to those authorities advising them as to the nature of the disease and the best means of preventing its spreading, and I have also issued a leaflet for general circulation amongst stockowners, describing the symptoms of the disease and the steps which ought to be taken on its appearance.

September 18th.

ANTHRAX.

Mr. WASON asked the President of the Board of Agriculture whether, considering the persistent vitality of the bacilli of anthrax, and more especially of their spores, as proved by the researches of Rastem and other, he will impress on local authorities the importance of burning the bodies of animals infected with this disease.

Mr. GARDNER: The objection to burning the bodies of animals affected with anthrax is that without costly and elaborate appliances the operation entails the cutting up of the carcass and its movement to a convenient place, both of which acts are obviously undesirable. On this account we have advised local authorities that burial is the least dangerous method of disposing of bodies in such cases. As my hon. friend is probably aware, the microbe in anthrax is ærobic and cannot therefore live without air, and I am informed that it has been demonstrated that it does not retain its vitality in a carcass which has been buried without having been cut.

Proceedings of Veterinary Medical Societies, etc.

THE NATIONAL VETERINARY ASSOCIATION.

THE eleventh general meeting of this Association was held in the Manchester Town Hall on July 26th and 27th under the Presidency of Mr. Edwin Faulkner. More than eighty members were present, besides a considerable number of visitors.

At the commencement of the proceedings the Lord Mayor of Manchester met the members in his room, and welcomed them in the following terms:—Gentlemen, I desire to express in a very few words the great pleasure it is to me to have the opportunity of welcoming you here this day, representing, as you do, an important branch of science that has in these days become very prominent, and has exercised great influence on the comfort and well-being of the public at large. Time was when comparatively little was heard of your Association, but during the last few years especially it has become very prominent in relation to many public questions, more especially those affecting our large population in reference to its food supply, and other matters affecting the agricultural interests in our country districts. Agricultural interests, we know, have been almost totally ruined, and at present they are only a grade above that position. We have therefore to look outside our own country for our food supplies, and Manchester will in the near future be in the position of an important port, in which steps will be taken—and where I believe proper appliances and conveniences will be arranged—for a large importation of foreign cattle. This, I need not tell you, is a very important matter as affecting the food supply of the people, because it is necessary that the cattle when imported should be properly examined, and care taken that nothing that is unsuitable for food shall be distributed to the public. Your Association, I take it, is one to which the public must now especially look for assistance in this respect, and therefore I heartily welcome you at this, the

opening of your conference, at which matters affecting the advancement of your science will no doubt be thoroughly discussed, and important progress made in regard to those questions in which we, as the public, are so greatly interested. I do not know that it is necessary for me to say more, but I hope by-and-by to have the pleasure of your company at lunch. In the meantime I must ask you to excuse my attendance, as I have other duties awaiting me.

The Mayor then retired and the President stated that a vote of thanks would be subsequently passed.

The minutes of the previous meeting having been confirmed and correspondence read, it was decided that next year's meeting is to be held in London, under the Presidency of Mr. Hunting. The Vice-Presidents and Council having been elected for that meeting, the Secretary's report was taken as read. This shows that the position of the Association is maintained, the number of members being 302.

The President delivered his address as follows :—

Gentlemen : A pleasurable duty now devolves upon me on taking the chair of the Eleventh Annual Meeting of the National Veterinary Association, to express my sincere thanks to those at whose hands in Glasgow last year I received the high honour of being elected President of this very important Association.

Believe me, I am fully sensible of the great privilege conferred in being chosen to preside over your deliberations, and the opportunity thereby afforded of combining with my confrères in the furtherance of those objects for which the Association was established.

The second duty is to offer you, on behalf of the Provisional Committee and myself, a very hearty welcome to this educational, municipal, commercial, and industrial centre, and express the hope that your visit may be attended with profit, pleasure, and happiness.

The third, to mention a subject of congratulation to all—the favourable auspices under which we meet, through the very considerate kindness of the Lord Mayor of this city.

The practice of veterinary science has undoubtedly made rapid advance of late years; but we in this city of the north have every right to hold in cherished memory those pioneers, by whom the foundations in this district were laid, in the persons of the late Messrs. John Lawson, Haycock, and Tom Taylor; aided by Mr. Thomas Greaves and Mr. Peter Taylor, whom we are happy and proud to have still amongst us, as living examples of that ability, industry, earnestness, and natural love of animals which goes so far to make the professional gentleman.

That the veterinary practitioner with good principles has at once a profession noble and ennobling is capable of demonstration, in that he seeks to relieve and remove pain and suffering, maintain health and usefulness with necessary comfort, prevent sickness, interpret signs and symptoms in dumb creatures, in the doing of all which lies pleasure, happiness, and an elevating influence.

As a profession we have been mindful of the close relationship existing between the general public, agriculture, and ourselves, and have consequently made it our endeavour to well serve and protect the best interests of all, by trying to limit and suppress the diseases of animals communicable to man, such as rabies, anthrax, glanders, tuberculosis, and the other contagious diseases of stock, as foot-and-mouth, pleuro-pneumonia, and swine fever, which are such a serious danger and loss.

In this connection our Association may fairly claim to have done good work, as the following synopsis of subjects brought forward at its various meetings will show :

I. Public Health, as affected by food supply obtained from animals.
II. Eczema Contagiosa, or Foot-and-Mouth Disease.
III. Pleuro-pneumonia Contagiosa.
IV. Swine Fever.
V. Micro-parasites of domestic animals, viz.: Splenic Apoplexy, Quarter Evil, Glanders, Tubercle in the udders of cattle and in milk.
VI. Anæsthetics and Anæsthesia in relation to Veterinary Practice.
VII. Dishorning and Overstocking animals, and the cruelty.
VIII. Slaughtering and Destruction of animals.
IX. Cow Pox, Vaccina.
X. Tuberculosis.

The importance of veterinary science to the nation was early recognised by the Royal Agricultural Society of England, and the Highland and Agricultural Society of Scotland; and, thanks to their fostering care, its utility has been sufficiently proved in the services rendered to the State by the Veterinary Department of the Board of Agriculture in the suppression of pleuro-pneumonia contagiosa, and eczema contagiosa, or foot-and-mouth disease; the Army Veterinary Department in the banishment of glanders from that service, and its otherwise improved hygienic condition; the various Horse Breeding Societies by the decrease of hereditary diseases; and I am sanguine enough to believe that were swine fever, glanders, and tuberculosis dealt with after the manner of pleuro-pneumonia, we should at all events, ere long, be rid of the two former; and the latter, if not eventually removed from amongst our animals, would at least be more under control, and the danger therefrom reduced to a minimum.

Doubtless the great cause of our having provided for so long a home for these contagious maladies has been permissive legislation, which admits of one local authority being active, advanced, and enlightened in its action, whilst another is inactive and indifferent. But now that experience has taught its futility, there is every prospect of a successful eradication through centralisation of authority and uniformity of action.

To the credit, however, of the local authority of this city (viz., the markets committee of the corporation) be it said, that in the administration of the Contagious Diseases (Animals) Act, the exact letter, meaning, and spirit of the Act has been strictly carried out, with a view to protect not only the citizens, but their neighbours, for in outbreaks of glanders—a disease at once loathsome, at present incurable, and communicable to man—not only have the diseased been destroyed, but in-contact animals also (with the consent of the owners) and compensation paid; so also with swine fever, a system desirable as destroying centres of disease and preventing extension of the contagion.

Further, to this commendable and laudable spirit an appointment has recently been made by the same committee of a veterinary inspector of meat, an institution that we hope to see so useful and beneficial as to create a general demand for specially-trained veterinary officers of health, with capacity for the work, and thoroughly equipped by practical experience, to collaborate with medical officers, for so important do we, as a profession, consider the question of meat and milk supply that once again we have ventured to bring one branch of the subject forward.

It is now nine years since this Association held a most successful meeting in Manchester, at the Owens College of the Victoria University, under the presidency of my friend and partner, Mr. Greaves, and debated the question of food supply; but since then the study of comparative pathology, bacteriology, microscopy, and chemistry has so advanced in scientific accuracy

changing speculative theories into hard practical scientific facts with regard to the causation, prevention, and pathology of diseases intercommunicable between animals and man, as to make it a public duty that we should put forward and discuss what is now known, and can be proved, avoiding for the present that which is speculative and the outcome of generalisation.

As showing the necessity for inspection, permit me here to state a circumstance that occurred some little time ago. A cow was sent into the abattoirs, from a place in this city, to be slaughtered for food. On inspection she was found to be the subject of progressive generalised tuberculosis, with tissue wasting; consequently, the viscera and carcase were destroyed. An inspector then paid a visit to the byre of dairy cows from whence she came, and there found another, quite emaciated, and in a more advanced state of tubercular disease than the first; but, thanks to the inspector's visit, she was speedily destroyed, and her capability for ill ended.

From the study and practice of veterinary hygiene and sanitary science, the general health and condition of the lower animals has materially benefited, so much so that diseases which in years gone by were of frequent occurrence are now but rarely met with; and having much advanced in pathological knowledge and the cause of disease, we have still to progress in prevention and assist cure by further laboratory work of a complete nature, with increased therapeutic and pharmacological knowledge.

To meet these demands the veterinary student must, within a short time, possess an educational knowledge approximating to that of the medical, undergo a course of professional education extending over a period of four years, and pass four professional examinations, in order to qualify for the diploma of the Royal College of Veterinary Surgeons, and be equipped for his future life as a general practitioner.

There is, however, a field as yet untouched in the higher education of veterinary post-graduates who are suitable to become specialists in original investigation and research, and for educational purposes; but means to the end are much wanted, such as grants and endowments, aids that in the sister profession in this country, and the veterinary on the Continent, are forthcoming; but here, I regret to state, under present circumstances, must largely be the outcome of individual exertion or combined professional self-help.

The proposal to establish an Institute of Preventive Medicine as a practical outcome of the successful Congress of Hygiene and Demography held last year, which contained sections with representative medical and veterinary workers, will, I feel sure, have the heartiest possible support that our profession can give, if carried out in the same manner and spirit as the Congress, viz., by a collaboration of the two professions in the conduct of investigations into diseases in man, analogous to those of the lower animals, as also the supposed possibility of scarlet fever, diphtheria, etc., being conveyed from the lower to the higher animal; for if right, and not erroneous deductions are to be drawn, surely the veterinary pathologist and clinician is a most important factor, possessing as he does that essential knowledge so necessary, yet non-existent in the medical investigator of these supposed transmissible diseases.

Turning now to this Association, I wish to ask, "Is it numerically representative of the profession, and supported as it ought to be?"

Although the number of members is now 302, and we are stronger than at any period last year, yet in a profession of about 3,000 members, 10 per cent. cannot by any means be considered an adequate representation in numbers, or such as a National Association may fairly claim to have; consequently the executive are anxious to go upon lines that may rouse the apathetic and make this Association national in more than name.

The difficulty does not arise so much in obtaining as retaining members, in consequence of the meetings being held yearly in different centres, often wide

apart; thus individual annual attendance does not obtain, interest slackens, and members drop off.

The last Manchester meeting added many who, in the course of time, ceased to subscribe; this year others have joined whom we now desire to interest and retain.

Our honorary general secretary, Mr. Malcolm, has given so much thought, and shown such a deep concern for an altered condition of things, as to suggest a scheme for consideration, by which the difficulties may possibly be overcome. He proposes an amalgamation of this Association with that of the National Veterinary Benevolent and Mutual Defence, which has now some 134 members.

These two combined Associations are wealthy, so that the scheme to be carried will require the funds being kept separate, a yearly subscription of one guinea, and probably two sets of officers, all of which details might be arranged at a joint conference, provided those most interested could see their way to a development of these suggestions for the general professional good. By these means members of the National who were not also of the Benevolent and Defence, would have an abiding interest when that Association's meetings were not accessible; and those of the Benevolent and Defence Association, but not the National, would become identified with, and interested in, an Association which is endeavouring to advance professional interests, and increase its knowledge and public usefulness—in the doing of which all may be cheered by taking to heart the words of Longfellow:—

Let us, then, be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labour and to wait.

Mr. TRIGGER: I am sure you will all agree with me that before we proceed to any further business we must accord to Mr. Faulkner, our President, a hearty vote of thanks for the very excellent address that he has read to us. It is a first-class paper, such as we expected from him, and he has in no way failed us. The address of the President, as you are aware, is not open for discussion. I am sure it contains a large amount of food for reflection, and you will agree in according the very hearty vote of thanks to Mr. Faulkner which I now beg to propose.

Mr. KIDD seconded the motion, which was carried by acclamation.

The PRESIDENT: I thank you very much indeed for this indication of your appreciation for my small endeavour. You can be quite sure that it has been a little effort for the sake of the profession, and the sake of the repute of this Association, and also the repute of the profession in Lancashire and the surrounding districts. I thank you very much.

The next business is to proceed with Professor McFadyean's paper, entitled, "The Requisite Inspection of Animals intended for Food, prior to and after Death, with the most Humane Modes of Slaughter."

The discussion on Professor McFadyean's paper on

"MEAT INSPECTION"

was opened by Mr. Hunting (in place of Professor McCall, who was unavoidably absent), who confessed he did not know very much about the subject, and that he would not do too much as a "devil's advocate" in criticising the paper. He then continued:—

In the second paragraph you will find, referring to the modes of slaughter, I think, as concise a summary of what should take place as possible. "If a number of methods stand at our disposal, then our preference ought to be given to that which is the simplest in execution, the least expensive, the least injurious to the carcase, and the least liable to miscarriage or accident;" and

then the paper goes on to discuss which system of slaughter is most in accordance with these requirements. The author mentions the pole-axe, a broad-faced hammer—which produces a different effect—and pithing. With regard to the method of producing unconsciousness by a blow on the head, or by pithing, there are one or two remarks I should like to make. One great necessity in slaughtering an animal is that he may be thoroughly bled, or at any rate one great necessity for the preservation of the meat. If you do not get as much blood out as possible, you do not put it in the best position for keeping purposes. Any method of stunning which produces very rapid death is objectionable, because the quicker an animal dies the worse it bleeds. From some little experience I have had I find that a pole-axe produces death quicker than a blow with a blunt instrument. A bullock dies about four minutes after being pole-axed, whereas a blow on the head which stuns it will leave the beating of the heart to go on a very considerable time after that. In the paper, under the head of pithing, it is said: "Animals thus killed do not bleed well." I should be inclined to think that is very likely to be true, because no methods of producing unconsciousness, if it does produce unconsciousness, that I have seen, kills an animal more suddenly, and apparently more thoroughly than pithing. Some years ago I had the opportunity of seeing the slaughter of animals conducted in Portugal, in a public abattoir. There they allow no method of producing unconsciousness except pithing. No country abroad takes the same trouble with its meat as Britain. The ordinary nicely trimmed joint that one sees here is not required. Their cooking arrangements are different; the result is, the meat is cut up much more roughly and rapidly, and probably the blood stains left in the meat by the more rapid process of death, resulting from pithing. would not be looked upon as an objection as they would here. I may say one thing in favour of pithing, however, that it seems to be, from what I saw of it, one of the most simply performed operations when a man knows how to do it; and I never saw any of the bungling that one does sometimes see with the pole-axe—except with the most expert men—and the still greater bungling which nearly always takes place in the knocking down of bullocks with a broad-faced hammer. I agree with the author that it does seem a shame that great care is taken to produce stunning of bullocks, because the bullocks can gore you or kick you, and that very little trouble is taken to put the sheep out of his pain, simply because the sheep cannot bite or kick. I have seen some grossly abominable cruelty inflicted upon sheep. The sheep is stuck, and before it is half bled a brutal butcher endeavours to break the neck, not even with the aid of a point of a knife between the vertebræ, but simply by brute force. I think the sheep ought to be stunned the same as other animals; and I know personally there is no difficulty in doing that with a heavy broad-faced mallet. Concerning the removal of blood from the animals, the paper refers to the Jewish method of slaughter; but, gentlemen, I have an unfortunate experience of trying to combine a discussion on science with theology, and I think I will let this subject alone. I may, however, point out that the slaughter as practised by the Jews is a ritual, and that perhaps the least thing one can say is that we might find in our own ritual and in our own notions something nearly as cruel, not to the bullock, but to the human subject. However, I will leave theology. On page 3 you will find a set of rules adopted in Saxony, and I do not think if one takes an hour that one can find a better set of rules, more concisely put, or more embracing the whole subject. The next part of the paper is devoted to the inspection of animals before and after death, and it commences with a short argument showing why animals should be inspected. It is hardly necessary before an audience of this kind to give any reason at all, but when you remember that probably disease is communicated by ingestion about as often as by any other process, it does seem remarkable

that, when we know there are a number of diseases transmitted from animals to man, that flesh has not been more thoroughly inspected in this country before now. We devote a good deal of time to the analysis of milk, sugar, coffee, and various other things—milk being very nearly the only one of them which contains any injurious material. We devote a lot of attention to water—correctly so—and to drains, and I am very doubtful whether we have done any good by doing so. I cannot see why we should not have adopted an inspection of meat long before this, excepting for the expense, and because any system which simply is applied to local districts, to big towns, and which leaves country places untouched, does a little good. but so little good that I can quite understand a local authority failing to take much action themselves. It is absurd to start an abattoir in a large town, and then to allow dressed meat to come in without inspection, because as I heard, I think at Birmingham, by a gentleman who lived a few miles outside—"I know Birmingham eats much bad meat, because all round us we send them all the dead carcases, and all the diseased meat we have to dispose of." I take it the same thing applies pretty well all round; and so long as the dead meat is allowed to be imported without inspection, so long, it seems to me, you have a very strong argument against the adoption of an abattoir. I would suggest to you that in the inspection of meat it would be a good plan if slaughterhouses were licensed all over the kingdom, and that no animal should be allowed to be killed for food except in a licensed slaughterhouse, and that all persons, all butchers slaughtering for food, should be licensed too, following, in fact, about the lines of the Anti-Vivisection Act. We are extremely careful that you shall not kill a guinea-pig except in a licensed place, and extremely careful that you must have a license before you are allowed to kill a guinea-pig even in a licensed place; but when it comes to a matter of your own convenience, for £ s. d. you can kill a bullock or a sheep how you like, where you like, and anybody can kill it. That sort of thing ought not to be allowed. It might be put a stop to by licensing the place and the men. Professor McFadyean asks the question, "By whom should the inspection of meat be conducted?" and that, perhaps, is the question of most direct interest to us, not as human beings or members of the community, but as veterinary surgeons. He gives a certain number of reasons why the veterinary surgeon should be the man; and those reasons, I think, are simply unanswerable. If the facts are correct, certainly neither the ordinary butcher, nor the medical officer, nor the sanitary officer, is fit to inspect meat. There is a gentleman who inspects meat in the London market, and he has written a book on the subject. I happen to know something of the value of his knowledge. I saw killed in Portugal two sheep. They were the best in the flock, but all the sheep there are thin. In no country are the animals fattened as they are in this; and the result is, that if you saw mutton killed in most Continental countries, you would say that it looked extremely thin. These looked extremely thin compared with our fat sheep. They were really fat compared with the ordinary sheep of Portugal; but when these two carcases were sent into Smithfield they were both condemned as unfit for human food. I saw the animals alive, I saw the animals killed, and I saw the carcases after death; and, I tell you, more perfectly healthy carcases could not exist. But the gentleman who is an amateur meat inspector, who presides over our food in London, and who has written a book on the subject, recognised them as unfit for human food. Naturally the men who have had a training all their lives on the appearance of disease in animals, and who know the *post-mortem* symptoms of disease, are most fitted to detect any disease of the carcases of animals when dead, and they are the only persons who can detect it while alive. We may be told that our men have insufficient experience in the inspection of meat to take the place of the butcher, who has obtained a very great amount of practical knowledge. That is quite

true; but with the training our men already possess, and with the additional training it is proposed to give them, any ordinary qualified veterinary surgeon, I have no hesitation in saying, after a month or two months' experience in the slaughter-house, would be in a position to give a far better opinion than any practical butcher, no matter how many years he had been at it. On page 5 you will find a paragraph in which the author says:—"It may not be out of place here to point out that while it is the legitimate and natural function of the veterinary surgeon to act as the inspector of meat, that does not give him a title to determine whether any given disease renders the flesh of any animal affected with it unfit for human food." With that I quite agree. It is certainly the duty of the medical officer of health to look after the health of the human beings in his district, and not of the veterinary surgeon; but it is our duty, if the thing is to be done properly, to tell the medical officer of health what the condition of the carcase is, and what the animal suffered from, and then leave him to say whether that should be used as human food or not. Again, in many cases the existence of disease or putrefaction is a matter of degree, and when it comes to a matter of degree, so that we may have three or four men on one side, and three or four on the other,—then the medical officer of health should be in attendance, and on him should lie the responsibility of determining whether that should be fit for human food or not. Inspection prior to the slaughter of meat, I agree, would be most beneficial. But I am inclined to think that the author has underrated the difficulties of doing so. These rules that I have just referred to as being in existence in Saxony provide that a man shall be allowed to kill an animal to put it out of pain, say for a broken leg; and it is a very easy thing for a butcher to have an animal with a broken leg; he need not break its leg before he kills it, but he can break it immediately after he has killed it, and point to the broken leg as the reason why he did not call in an inspector. In fact, they do the same in London now when they want to kill a glandered horse. The *ante-mortem* inspection of animals, of course, would be easily carried out in an abattoir, but the *ante-mortem* inspection of animals in a village is not quite so easy. At any rate, it would interfere a good deal with a man's business if he had to wait for the inspector always before he killed his animal, unless you allow the inspector to see the animal at any time within forty-eight hours of its being killed. Now as to the inspection after death. All I have to say thereon is that Professor McFadyean has most thoroughly covered the ground, and I think he has been a great deal too minute. I do not think it is possible for anybody to carry out to the full the description of inspection that he would advise; for instance, that the mammary glands should be incised, and the liver should be incised. Now the butcher would object very strongly to your regularly making experimental incision in the organs of the carcase, unless Professor McFadyean means that you would only incise these things when you had a suspicion of disease. Naturally you would do so then. Now, whatever system of inspection is adopted, I think you will allow it should be uniform and general; and if you make the inspection of an abattoir extremely stringent, because you have the man in your power, you will do harm, and you will be guilty of unfairness. The effect of making the inspection in an abattoir too stringent would be to drive the slaughter of animals back into the country districts, and you would have to institute, at any rate, a very careful supervision of all the meat sent in dead. And if you inspect the dead meat killed in this country you must logically inspect all dead meat imported into the country, and that is a very strong reason in favour of what is now being discussed—the marking of foreign meat. If we do the thing at all, it should be done thoroughly. If we establish abattoirs in large towns, and have inspection properly carried out there, I think all the slaughterhouses in the kingdom should be licensed; that all dead meat should be inspected;

butchers should be licensed, and foreign meat should be marked, and marked in some way so that anybody can distinguish it. A man sees the mark on the meat, and he knows what that mark means. It is his own option then whether he buys foreign meat or English.

Mr. MERRICK: Three or four years ago I accepted the invitation of the British Medical Association at Birmingham, and I there asked a question which has never been answered. It has not even been mentioned in Professor McFadyean's paper at all. This is the point. I, in my practice, have very often ordered the destruction of a beast subject to parturient apoplexy. Medical men hold that no animal that has died or been slaughtered within a certain time of parturition is fit for human food. I want to ask the opinion of the profession and the opinion of Professor McFadyean on that point. I often cut an animal's throat to save its life, and I should hold that in such cases the animal is fit for human food. I look upon parturition as a natural event. It may not be quite as good meat, but it is quite as good as the Portuguese mutton. I can quite bear Mr. Hunting out, because I have had experience of South African mutton. Cape men come over here, and they cannot eat our mutton because it is too fat. The only thing we grumble about over there is because the mutton is too lean. I would ask the opinion of the profession as regards the condition of the meat of animals which have suffered from parturient apoplexy and have been slaughtered, which have calved in a perfectly natural way, and in which the calf was not of course in a state of decomposition.

Sir HENRY SIMPSON: The paper which Professor McFadyean has very kindly submitted to us was one which I had looked forward to with a very great deal of interest, not because I have taken a very great deal of interest in the subject, but because I desire to learn a very great deal on the subject, and I wish to tender to Professor McFadyean my individual thanks for having enlightened me extremely on this very important question. I think we all agree that the inspection of meat is to be the occupation of the veterinary surgeon in the future, and, with that in view, I certainly had almost desired it had gone a little further and enlightened us as to what diseases in the Professor's opinion were such as to render a carcase unfit for human food. I daresay that is asking a good deal too much, but if the Professor will on another occasion enlighten us further on that matter, I am sure we shall all owe him a debt of gratitude in addition to that which we owe him at the present time. I always try, if I can, to reduce science to practice, and there are one or two matters in regard to which I desire to say a word or two. I find Professor McFadyean alludes to a matter which Mr. Hunting alludes to with regard to the medical officer determining what disease shall render an animal unfit for human food. Of course, looking at it practically, if we were to be inspectors of meat, we shall not only have to be inspectors of meat, but we shall have to give a decision as to whether it is fit for human food or not; and I think if we have to advocate before the public that two appointments will be necessary to decide that question, we go a long way to prevent our services being called into requisition. It would be quite easy at a conference to tabulate the diseases which render animals unfit for human food, and, in my opinion, the veterinary surgeon should not only be the inspector of meat, but should determine whether it was fit for food or not. I am sorry to learn that Professor McFadyean thinks the inspection of carcases is a mistake; because, looking at the present supply, and what is likely to be the supply of animal food in the future to these islands, we must be prepared for a very large importation of dead meat from abroad, and we must be prepared, in regard to the large towns, for a large importation of dead meat from without; and therefore in many cases, perhaps in the majority of

cases, an inspection of the viscera, which would aid us very much indeed, is quite out of the question. I think we must try and concentrate the greater part of our energy upon determining the fitness of a carcase for human food with such evidence as we can obtain. Of course, I quite admit that the most perfect system is that which Professor McFadyean recommends, but, under the circumstances, I think we all agree that that is not possible. If we were limited by circumstances to an examination of a carcase, I should be glad to know that we could in some way exercise some supervision and examination which would certify to the British public that we were capable of determining whether it was fit for human food or not. I am very much appalled at the price which inspection costs under the very strict rules which are in operation in Berlin, at the abattoir. I see Professor McFadyean tells us it costs £25,000 per annum: anything of that kind, I am afraid, is not likely to attract the British ratepayer. I should like to know—probably Professor McFadyean will be able to tell me—whether that inspection is carried out in Berlin by veterinary surgeons or by other professional men. I am afraid what I have said has added very little indeed to the elucidation of anything new, but, as I say, what I desire is that the veterinary surgeon in the future should be the inspector of meat; that he should be the man to determine whether it is fit for human food or not; and I do desire, if possible, that he should concentrate as much attention as possible on the carcases, in view of the community being supplied with dead meat imported either from abroad or imported into large towns. I got yesterday a cutting from the *Standard* of a case tried at the Guildhall, and I see no mention of a veterinary surgeon being engaged—one never does. There was a prosecution. The medical officer of health for the City said that an animal had tubercular disease, and he sent it to Dr. Darwin, the lecturer on hygiene at Guy's. In the end the man—a very respectable farmer—was fined £25, and he said he did not know the lungs were bad.

Mr. PETER TAYLOR: This subject of food inspection is a very wide and important one, both to those who are practising in our large towns, and those who are practising in our suburbs and in the country districts. I should have liked Professor McFadyean to give us his opinion as to the way in which carcases are presented to veterinary surgeons in the present day. I am a great believer myself in public abattoirs. I am a great believer in doing away with those abattoirs in which animals are killed by small butchers; and I am a great believer, if it possibly could be done, in inspecting cattle before they are killed. The inspectors would then have the opportunity of ascertaining whether the animal is in a diseased or in a healthy condition. There are many diseases, no doubt, that would be quite discernible by the veterinary inspector: but before he is called in to ascertain the quality of a carcase you have the police inspector, you have the constabulary inspector. The veterinary surgeon is called in to accentuate these men's opinions, and it is a true saying that these men assume a great deal that they are perfectly ignorant of. They assume to have perfect cognizance of different diseased structures, about which they are as ignorant as any ordinary man who walks the streets; and if, forsooth, a veterinary surgeon is called in, these men wish to dictate to him. We are called in to ascertain whether the carcase is fit for human food. The carcase has been dressed, and you see neither lungs, viscera, nor any internal organs. You do not see the skin, and yet you are expected, as an expert, to tell whether the animal has died, or whether it has been in the last throes of death, and whether the meat is fit for human food. And this you are expected to do on a merely cursory observation. Of course, no butcher will allow you to cut into the mammary glands, as Professor McFadyean has told you; no butcher will allow you to incise the liver to see if it is affected

by tuberculosis. You can inspect—if it is there—the mesentery, and probably you may inspect the lungs, and you are expected to be able, without sufficient data, to place your fingers upon a carcase and say whether it is fit for human food. Who is to decide this matter? Here we have my friend Professor McFadyean saying that even the carcase of an animal that had puerperal fever is fit for human food.

Professor McFADYEAN: No, I do not say that.

Mr. PETER TAYLOR: I contend that if a cow has been in labour, and has died within twenty-four hours, it is not fit for human food. I am strong upon that point. There is no doubt that we are behind in this 19th century, and if you are determined that veterinary science, and that you, as representing the veterinary profession, shall ascend to a higher stage in the ladder of science you must look to yourselves.

"To thine own self be true;
And it must follow, as the night the day,
Thou canst not then be false to any man."

But, gentlemen, there is something else which we have to consider. Is it derogatory in us to meet the constabulary inspector and the police inspector? He produces to you a paper as long as your arm. You have to elucidate the symptoms; you have to tell him the temperature, and you must wind up and tell him what the animal has died of, and after that you must value the animal. You see the carcase and you have to say if it is fit for human food. Now, as a practical man I say, as I have said before—

"A little knowledge is a dangerous thing;
Drink deep, or taste not of the Pierian spring."

I am a man who has been in practice for over forty years, and I have got to such an age that I can hardly see with my natural eyes. But then we get a microscope, and with it we investigate disease and diseased germs. We have the tubercle bacillus, we have the anthrax bacillus, and we have, no doubt, if it could only be found out, the puerperal bacillus, and I do not know how many hundreds more. Now, we are told by a great authority on sanitary science—and the police will tell you—that tuberculous beef, if it is well cooked, is fit for human food. No doubt it depends upon the stage; but I remember Professor McFadyean telling us that tuberculous meat is not fit for human food. Then, with regard to milk. Tubercular contamination of milk is most dangerous to the rising generation, and the sale of such milk ought to be stopped immediately. If I had the power I would stop it to-morrow. I would ask the professor to enlighten us upon these points, because I want to understand thoroughly what I am doing in dealing with these matters. I should like the professor to tell us the most humane mode of destroying cattle. In France they use the pole-axe. If it is a young animal they cut its throat, or stick it, and it will bleed for half-an-hour. I was very much interested in their abattoir, and remained there the whole day watching the operations that were carried on. I am sure that we are very much indebted to the professor for this paper, and I hope that on another occasion he will add to the information that he has given us upon these important points, especially with regard to the great point of whether such meat as I have described is fit for human food. I thank you all for listening to me, and I hope I shall be with you next year.

Mr. LOCKE: The subject before us is one in which I have taken very great interest of late. When the discussion was opened I did not hear the remarks of Mr. Hunting with regard to the modes of slaughter. To my mind this is a very grave subject, because the public seem to be alive to the fact that more care ought to be taken with animals that are to be destroyed for human food, and the best modes should be adopted for their slaughter. We now and then

see in the papers letters written with regard to the different methods, and I am very pleased that the professor has given his opinion that the best method is first of all to stun your animal. I think with him that that is by far the best way of destroying. Some time ago there was a trial with regard to the mode of killing adopted by the Jews. Professor Gamgee, I believe, and several other professors gave it as their opinion that quick bleeding was the best mode of death—that it was an almost painless operation. I should be very pleased if Professor McFadyean would give us his opinion whether that is so or not. The pithing of animals, I think, is a very dangerous mode, and one that would not be practised in this country. Then we come, on page 4, to the requisite inspection of animals. It has been contended by a good many people that a butcher is the right and proper person to make inspections of food supply in the markets—that is, by people who have not, perhaps, thought the matter over very carefully; but to my mind, if they would only read the three sentences on page 5, they would not do so any more. "The main object of meat inspection is to exclude from the market all flesh of an unwholesome character," that is, to detect "the presence of pathogenic bacteria, capable of exciting specific diseases, such as anthrax, or tuberculosis;" also "the presence of animal parasites;" and also "the presence of poisonous substances." The ordinary butcher, although he may be able to tell whether the meat looks well, and appears fit for food, would not be able to point out the presence of such unless it was a very bad case. I am very pleased to say that the Manchester Corporation have taken the initiative in this matter, and have appointed a veterinary surgeon as their head meat inspector. I consider this a move in the right direction, and would like to impress upon all veterinary surgeons to bring what pressure they can upon their municipal authorities, so that members of the profession should be appointed as meat inspectors in all large cities. This, of course, is only in its infancy, and I think that if they put themselves out of the way to bring this matter forward before their representatives, eventually it will come about. At the same time I see a great difficulty in the thorough inspection of meat so long as we have private slaughterhouses. The public meat inspector cannot possibly visit all these private slaughterhouses, and it is not at the public slaughterhouses where diseased animals are brought; it is at the private ones where diseased meat is smuggled in, and where an inspector cannot possibly get to see it. I should also impress on members of the Association, wherever they have the opportunity, to try and get rid of private slaughterhouses. Professor McFadyean goes very minutely into the question of examination; and I am afraid the inspector, with three or four hundred cattle to inspect, would find that he could not possibly carry out these details in the very minute manner which is proposed; but I expect, when there is a case of doubt, that the professor intends that his minute directions should be carried out. There is another subject which I think is of very great importance, namely, the detection of the signs of putrefaction. We all know that that is where a great deal of disease originates in the human being, by eating flesh that has commenced to putrefy. Professor McFadyean gives a very good test whereby any veterinary surgeon or even private individual would be able to tell whether putrefaction has commenced, and I think it is of very great importance that he has brought this forward, and it is very instructive to all the members of the Association. I do not know that I have anything more to say upon the matter. I feel that the subject is one of great importauce, and I hope it will be thoroughly discussed, so that we shall learn something before the meeting is over.

(To be continued.)

THE CENTRAL VETERINARY MEDICAL SOCIETY.

(Continued from p. 214.)

In the earlier portion of this paper I referred to the study of bacteriology as one of the sciences to which the dominant school has given special attention, but as the object of this study has been rather to prevent the dissemination and spread of the disease than to cure it, I shall content myself by simply remarking, *en passant*, that so far as I have been able to glean from an examination into results, even less practical benefit to mankind and the animal world has accrued from the immense amount of intelligence and labour that has been devoted to its consideration, than from the efforts at curing disease under the so-called rational system of medicine. In proof of this, I have merely to refer you to Professor MacFadyean's experiments by inoculation for the prevention of black quarter; to a brochure, written by T. M. Dolan, Esq., M.D., anent "Pasteur and Rabies," wherein this gentleman proves conclusively that Pasteur has done very much more to spread rabies than either cure or prevent it. And similar proof of failure may be advanced against Professor Koch with regard to his anti-tubercular injections; for, as was remarked by Dr. Dudgeon in his presidential address before the British Homœopathic Society in 1891, "It is now generally admitted that the whole business is a lamentable fiasco. That none have been cured and many killed by it." Micro-organisms pathogenic and non-pathogenic have been discovered, *ad libitum*. To take a few of those which would naturally be considered not only the most serious, but if there is anything of a preventive character at all in inoculation the most useful, we may mention the bacillus of septicæmia, of typhoid fever, of choleraic diarrhœa, of glanders, of swine plague, of leprosy, of anthrax, and of tuberculosis, but after all the cultivations, inoculations and test experiments, can you point to one single practical outcome towards the certain prevention even, to say nothing about their cure, of any one of the various forms of disease which I have enumerated? I have no manner of doubt that for every disease included in your pathological nomenclature there is some form of micro-organism peculiar thereto, but if you think that by isolating such organism and cultivating the same up to millionths and trillionths, you are going to obtain a preparation that by inoculating a healthy subject therewith you can prevent the development of disease, I believe you are encouraging yourself in a lamentable fallacy, and I have the results in such experiments of recent years to bear me out. If after all that has been done you can show no better results than those which are common public property, I respectfully submit that it is high time you directed your energies into other and more promising channels of labour and investigation. I could possibly anticipate some of the replies that may be offered to these rather sweeping charges against the pet science of the day, but I have little doubt but that the castigation I shall receive at your hands will be quite as much as I can stand against when it comes to my turn to reply.

I have endeavoured to give you some of the objections I have against the "governing law of empirical observation," which is your guide in therapeutics; it now becomes my duty to explain what principle I rely upon in place thereof, and how the same is applicable under the term symptomatology.

Now I know well that it is a very common thing for members of the "dominant" or "rational" school of medicine to decry symptomatology, and to treat with but barely veiled contempt men who treat, as they style it, only the symptoms of a patient; indeed, Dr. Murchison once so far forgot himself as to state in a lecture that "it requires no medical education to treat symptoms as the homœopathist does." To attempt to argue with anyone, much less a professionally trained man, who resorts to such statements as this, under the belief that it is argument, is very much like throwing pearls before

swine ; and I shall not so far waste either my time or your own by attempting to refute it—the task would be but child's play, but the game is not worth the candle. Now let us ask ourselves the question : what are symptoms ? I reply that symptoms are the effect and manifestation of a diseased process evinced either subjectively or objectively, or more likely both conditions exist. It does not, however, follow that because symptoms are manifestly observable that they constitute disease. Nothing of the sort, they do not, but they enable the practitioner to recognise the existence of disease, and, like finger posts on the main road, they point out the way which will with the least loss of time enable the medical traveller to reach his bourn, in other words cure his patient ; it has been tersely stated in the monthly *Homœopathic Review*, "the physician deprived of his knowledge of symptoms would be like a sailor endeavouring to steer his ship through some intricate and unknown channel without his nautical charts. Symptoms then are indications which lead, by reflection on the ordinary course of physiological action in those parts of the body where they arise, to a knowledge of disease. They tell us what organ is out of gear, and the manner as well as the degree in which it is so. They teach us the nature of the morbid process we have to remove, they constitute our guide to the measures necessary to its removal." "But," say some of the objectors to symptomatology, "you find such-and-such a symptom, or perhaps symptoms, arising, and you at once fly to your materia medica to counteract the same." Nothing of the sort ; those who are true symptomatologists, in other words, those that are true followers of Hahnemann, do nothing of the kind. Selecting isolated symptoms and taking them up, one by one, as they present themselves from day to day during a course of illness, would expose anyone so acting to the charge of symptom treatment, and be worthy of all the cynical sarcasm which the vocabulary of such periodicals as *The Lancet* and *Medical Times* includes ; and it is only a most lamentable ignorance on the part of those who pretend to argue on these lines against the selection of drugs according to the real principles of symptomatology, that prompts such persons to advance these and similar objections thereto. No, the symptomatologist proper, viz., the person who prescribes for a disease process according to Hahnemann's therapeutic law of drug selection, has to embrace in his catalogue of symptoms full particulars of two distinct classes ; first, those which are capable of being artificially produced in the healthy body by drugs ; and second, those which present themselves in the course of disease, "called into being by some disregard of physiological laws." But before any use can be practically made of such information, it is necessary that not merely a few prominent symptoms should be noted and compared, but in each instance the totality of the symptoms, be the subjects such as aches and pains, or objective such as visible eruption, stethoscopic signs, or urinary analyses must be taken together. "It is this totality which forms the guide of the 'symptomatologist,' not only in diagnosis and prognosis but also in treatment ; it is this totality which tells of the presence of disease ; it is the removal of this totality which assures us of the removal of disease ;" and in this manner is disease treated by the light of symptom. There is a class of writers on medicine, and they may notably be discovered on the staffs of the *Lancet* and the *Medical Times*, who wilfully close their eyes to the fact that followers of Hahnemann prescribe, not according to individual symptoms as these two periodicals would wish you to believe, but according to the totality of the symptoms observable in any particular case ; and more often than not, each case that comes under your notice provides two classes of symptoms, viz., first, those that are so plain that he who runs may read ; and second, those that are unmistakeably present, but call for the experience of a professional diagnostician to discover. They are not palpable to the eye of the ignorant empiric,

but to the more refined and intellectual prescriber, they are not merely manifestly clear, but they serve as landmarks in the search for a remedy. No doubt in searching for all the symptoms, you may come across some that may appear trivial and unimportant; should you do so, I direct your attention specially to them; they appear trivial and unimportant because you do not as yet understand their import. To explain more fully what I mean by this I propose to quote a case given in the *Monthly Homœopathic Review*, as follows: "The value of apparently trivial symptoms we saw, very marked, in a case of extreme nausea and sickness incident to pregnancy, as it happened a first pregnancy—all the generic symptoms usually met were present. There was not, however, so much actual vomiting as nausea, and disgust at food—but especially was there a dislike for bread. The patient said she loathed it, and nothing could induce her to touch it. This symptom, which would be ordinarily overlooked as a simple indication of indigestion, and one to be comprised with the heading of 'loss of appetite' meant more than this; what it meant we do not profess to understand, but it is one produced by *matrum muriaticum*, and as this drug also gives rise to the more prominent symptoms, the fact that it has this 'disgust at bread' in addition led to its selection. It was prescribed with but a faint hope of any good resulting, and with a fear that the nausea and sickness would endure for the usual time in spite of it or any other medicine. But it was not so. A few three-drop doses of the third dilution were followed by a return of appetite, an entire loss of nausea, and a capacity to eat bread, neither have any of these symptoms returned during the four months which have elapsed since the prescription was written."

From this illustration I desire to point out to you how absolutely important it is to seek and find out every observable symptom and to reject not even the most trivial, for unless you have the whole before you it is impossible to complete the pathological picture, which to effect a successful cure must be reflected in a therapeutic mirror obtained from a similar picture drawn from the pathogenesis of some drug.

It has always been a matter of profound wonder with myself that the school of medicine which, as I think, somewhat boastfully, claims for itself the title of "*rational*," never discerned the reasonableness of the relation between the disease-producing powers of drugs, and the physiological abnormalities to which names are given in the nomenclature of pathology, with a view to determine the curative powers of drugs. The very fact that such relation exists, one would have thought would direct the attention of the logical mind to the possibility of there being some connection between drugs and disease which would enable the one to overcome the other, certainly in preference to the possibility of overcoming disease by some agent which, so far as one could learn from the most profound knowledge of pathology, had no more relation therapeutically with such disease than the most extreme of opposites you can picture to yourself, even though your imagination be never so vivid. But the consideration of this problem brings before my mental vision the fact that the so-called "*rational*" practitioners have never properly tested the pathogenetic action of drugs. They know a great deal about the physiological action of certain poisonous drugs and how they destroy life; but as to the powers of such drugs when given experimentally to the healthy subject, to produce symptoms simulating certain pathological conditions they knew absolutely nothing. These discoveries have been left to Hahnemann and his followers, and because Hahnemannians, or homœopathists if you prefer the term, have been the sole source of information on this subject the so-called "rational" school has shut its eyes to this sort of investigation, and knows practically nothing about it; and upon the strength of its ignorance forsooth it ventures to ignore the value and importance of symptomatology, and charges homœopathists with merely attempting to treat symptoms. A

more flagrant piece of impertinent presumption I never came across. It is perhaps not to be wondered at that when the leaders of the profession and the medical journals denounce a system, the rank and file should not deem it worth the trouble of experimental research, but it is a fact well worthy of your serious consideration that there is not a single case on record where a physician who has honestly and conscientiously undertaken the study and investigation of the system by a series of clinical experiments, has not been compelled to admit its truth, and who has not been converted to its practice. A goodly number of instances might be cited, with the names of the parties concerned, where the investigation was undertaken under the firm conviction that it was a very easy thing to pour contempt and ridicule upon homœopathy, but as the gentlemen referred to were really serious in what they undertook and honest withal, they were in the end not only compelled to admit that failure attended their efforts to show the system up as a fallacy, but so convinced were they of its truth that they could not do other than fall into the ranks of the despised homœopathists and boldly come out as followers of the learned Hahnemann. These are facts which, the *Lancet*, the *Medical Times* and such like journalistic ilk, notwithstanding, ought to make any thoughtful man pause. Of course it is patent to anyone qualified to give an opinion on the subject that for the dominant school to admit Hahnemann's theory to be correct, means practically that it has for all ages been on the wrong track in treating disease, and no doubt this is making a very serious demand upon its moral courage; indeed everyday facts prove that this standard of moral excellence is far too high for the profession. A very casual glance at the works on materia medica published by Dr. Ringer and Dr. Lauder Brunton furnish abundant proof among the therapeutic hints therein that Hahnemann's system of drug selection has exercised a very potent influence on the minds of these gentlemen, who in their turn, of course, influence the profession at large, and I regret to say without that honourable acknowledgment of the source of their information which it is customary to expect of gentlemen. Plagiarism in the literary world is not as a rule looked upon very favourably, but Drs. Ringer and Brunton have been guilty of it with most unblushing effrontery.

In a paper on Symptomatology, the late Thomas Hayle, M.D., expressed himself as follows:—"Perhaps there is nothing more remarkable about the human organism in a healthy state than the absence of symptoms; and by this I mean the very little appeal it makes to the consciousness with which it is connected. It is an old saying that 'a healthy man shouldn't know that he has a stomach'; and it would be the perfection of an organism if the consciousness connected with it shouldn't know it had one, except through the senses by which it has in that organism a relation to the external world. To this perfection a perfectly healthy organised system very nearly attains." Then, after describing his meaning by illustrations from the circulatory system, the complicated locomotive apparatus, and the processes, chemical and electric, which are continuously going on in a healthy body, he adds "fearfully and wonderfully made, truly! But more fearful and more wondrous still the insensibility and the unconsciousness that sit enthroned in the midst of so much movement, and in the midst of so much feeling."

Now this is a very satisfactory basis for the symptomatologist to start upon; and whereas we know that every disease produces certain evidence of its presence through the media of symptoms, objective and subjective, and also that drugs given to the healthy subject are likewise competent to give rise to symptoms of a like character, and experiments without number have conclusively proved that the drugs which are capable of producing symptoms which in their totality represent pictures of some disease processes as they in turn are made manifest through the totality of symptoms, are as surely

competent to effect a cure and restore the diseased organism to a normal condition. Therefore, as a logical sequence, those who are guided by symptoms in the selection of drugs for disease, argue that they rely upon a theory based on reason; and that whereas they are able to give a reason for the selection of certain drugs under certain circumstances, and that such theory has been proved successful in practice, the rational school on the other hand which trusts to pathology alone for determining its selection of drugs in treatment cannot be said to have a guiding principle which all may follow. Then the symptomatologist claims to have proved the value and importance of this method of drug selection.

Although the pathologist will probably admit that he is guided to his conclusions by certain outward manifestations, which under some circumstances he allows himself to speak of as symptoms, he, in his endeavour to find out the cause and origin of disease, and give to every particular abnormal manifestation some definite name, overlooks a number of very important, though possibly minute, symptoms, and so treats every case, or rather endeavours to treat every case, generically, instead of individualising with minuteness and exactitude.

Let me ask you: suppose any case submitted to ten allopathic practitioners who were each respectively in ignorance that the other nine had made an examination and prescribed therefor; do you think it probable, nay even possible, that any two of the ten would write the same prescription, and if not, can it be said that there is any method or system in the practice of the dominant school? On the other hand, place the same case before ten homœopathic practictioners, and it is very long odds in favour of the whole ten writing the same prescription—certainly, so far as the selection of the drug is concerned. Now if this be so, it is very much like reducing medicine to an exact science, but even if they did not all agree, and the case were again gone into it would probably be found that the minority had failed to detect one or more symptoms either through their own carelessness of observation or lack of ability to obtain necessary particulars from the patient.

Referring to an objection I once heard raised against symptom covering, as it was styled at that time, it was affirmed that a large number of drugs produced the same symptoms, providing, as the objector said, the statements given in the homœopathic materia medica were correct. Yes, it is quite true that you will find the same symptoms under a considerable number of drugs, but in the case of every drug you will find one or more symptoms peculiar to itself and that are not observable in any other drug. The gentleman who raised this objection no doubt thought he had made a great hit; the fact is he pointed out the weak point in his own armour and the strong one in mine; his objection only serves to make it more than ever clear that trusting to individual symptoms is a fallacy, and to emphasise the absolute importance of minuteness and exactitude in detecting every symptom both subjective and objective.

Having special regard to our veterinary patients, I am quite prepared to admit that we have a very serious difficulty to contend against in discerning the subjective symptoms, but as you all know, at all events all those of you who have had fairly extensive practice, there are methods and ways of speaking among animals other than by word of mouth. By their movements and actions much can be learned of what they feel or suffer subjectively; true, they cannot tell you the character of a pain, whether it is burning or not, but there are always concomitant symptoms which may be observable objectively that will help to make up for this difficulty. Anyhow it seems to me that though there is this difficulty staring us in the face, it is far better to rely upon a system which has some decided method in its favour, than

trusting to haphazard prescriptions. How many times did you older practitioners, when you first launched out in life, and how often do the young men of the present day find themselves entirely nonplussed, when called in to what appears to be a bad case, to give anything like a satisfactory explanation either to your client or yourself, as to what is really the matter with your patient. You note a number of prominent symptoms, and you say to yourself this is a case of so-and-so, and meanwhile you prescribe a something; not being satisfied with your diagnosis, on arriving home you pull down your Williams or your Robertson from the book-shelves and refer to the disease you think you have to contend with. On reading carefully you find this and that symptom as you observed them in your patient, but, lo and behold, there are ever so many in the text books that your patient ought to have but has not, and you ask yourself the question is it this pathological development after all? Have you not found yourself in such a position many a time? If not you are more highly favoured than the majority of the dominant rational school.

Now, supposing you had been, like myself, a symptomatologist, what would you have done; instead of bothering your head to associate the case before you with some pathological definition to be found in Williams, or Robertson, or some other similar type of writer, you would have made a careful note of every observable symptom, never mind how apparently trivial, and if you had not got such a picture in your mind under the descriptive action of some particular drug you would refer to your materia medica, and for certain find it under some drug. To illustrate my meaning, allow me to refer to a case I reported some time ago of a very occult character—I refer to the St. Bernard dog that had two tumours in the abdomen, that was ultimately cured with a rather high attenuation of arsenic; the first symptom I observed in the dog was its restlessness and apparent anguish; next it was wasted to a skeleton; third, thirst, drinking little but often; fourth, adynamia, the dog was utterly prostrate and could not stand; fifth, the peculiar character of the cough. All these points were observed, as well as many others, before the tumours were discovered, and after they were I referred to the clinical reports and found that similar tumours had become absorbed under the influence of this drug, and that the whole of the symptoms referred to came under the pathogentic proving of arsenic. Hence I made my selection strictly in accordance with the totality of the symptoms, all of which were found under the heading of that one drug. Now before I found out those tumours were present, it would have been positively impossible to prescribe for him from a pathological standpoint, but all the other observable symptoms would have led to the selection of arsenic, and even though I had never discovered the presence of the tumours the result would have been the same. In this case the pathological school, three of them indeed, had a try at curing the dog before myself but without success; they had observed the cough and gone for that alone, whereas the cough was merely a concomitant symptom. This is merely one case, but I consider it a very excellent one, of the advantages to be gained from the system of drug selection by symptoms, rather than trusting to your innate intuition to decide what are the pathological developments of the case and how to treat accordingly.

Oftentimes I doubt not, even now the best of you, after years of practice, have great difficulty in determining right off what name to give to disease, that is to say, to your own personal satisfaction; and if you cannot answer that question honestly and clearly, how can you prescribe? On the other hand, if you undertake a thorough searching study of the system, the claims of which I am now advocating, and make yourselves master thereof, you would not only have the satisfaction of knowing that you were doing your best like rational men, but also of seeing your cases recover much more rapidly and with less wear and tear to the animal system.

I do not wish you to conclude that the study of this system is an easy one; it is not. It involves an immense amount of intelligent hard work; and you will discover, should any of you make the attempt, that the more you learn, day by day, the more there is to learn. But it is an intensely interesting subject, and in addition to the requirement of very deep thought to master the details of its logic, you will find that a fertile memory is an unmistakeable requisite, otherwise very frequent reference to the materia medica is a *sine quâ non*. I would suggest to those who contemplate giving support to the proposed Institute of Preventive Medicine, that the money it is suggested should be presented to that object would be much more advantageously and profitably expended in establishing an institute for experimental drug pathogenesis on animals of various kind and classes. From such investigation much useful confirmatory information as to drug action could be obtained, as well as a knowledge of comparative drug pathogenesy.

I was intensely interested in reading an account of several cases of parturient eclampsia in cows, as described by Mr. James Clark, F.R.C.V.S., of Coupar-Angus, in the *Journal of Comparative Pathology and Therapeutics* for March of this year. I have no hesitation in stating that, judging by the symptoms recorded, Mr. Clark has been guilty of as nice a piece of homœopathy as one would wish to come across, and I congratulate him on the success of the treatment. Judging from the symptoms, belladonna is just what I should have prescribed myself, and my attention would certainly have been drawn to this remedy from the fact that the cases all presented "great excitement, staring eyes, champing of jaws, frothing at the mouth, &c." There is also one very attractive and interesting feature in Mr. Clark's report; he had several cases, and of those treated with *belladonna alone* all recovered. One he treated with belladonna, chloral and potass bromide, which succumbed, and Mr. Clark regrets he did not bleed it. Better that he said he regretted mixing the drugs, and so counteracting the curative powers of the belladonna: there is one very important lesson to be learned from Mr. Clark's experience—that one drug at a time, when properly selected, is far more likely to produce satisfactory results than a mixture, concerning which you have no possible guide to inform you as to the probable result of its administration.

In the earlier portion of my paper I said that I should refer no further to those troublesome diseases known under the pathological terms, *Parturient Apoplexy* and *Rheumatism;* with respect to the former I reminded you of the many pathological theories advanced concerning it, and hence affirmed the difficulty which those of the dominant school experience in treating it. Now when you bear in mind how varied the symptoms are which present themselves in this disease, it is very easy to understand how difficult it must be to prescribe on pathological lines, even assuming for the nonce that the pathology was clearly understood; but on the other hand, if you take a case and study carefully the whole of the symptoms, at one period having the delirium and at another the coma as leading indications, I think it would be found a very much more simple matter to prescribe successfully. At all events, although I have had a fair number of cases under my care during the past eleven years I have yet to lose my first case. Then in rheumatism, to show the value and importance of being guided in your treatment by symptomatology, how numerous are the forms in which rheumatism appears and how varied are the symptoms. But these variations are all to be accounted for under given drugs: for instance in aconite the experiments of the Vienna proving Society showed that this drug was capable of producing pains in the joints, muscles, and fibrous tissues distinctly similar to those of rheumatism; and also in addition to the foregoing, palpitation of the heart and præcordial anxiety; and *post-mortem* examination, after increasing doses to rabbits has given evidence of lesions of the mitral valve; also inflammation of the pleura

and peritoneum have been observed. Again, as Dr. Hughes states in his able work, bryonia is incomparably the best remedy after aconite for acute rheumatism. "In its whole pathogenetic action, it reminds one of the rheumatic poison. Its feeble affinity for skin and mucous membrane, and its powerful influence over serous and synovial membrane and muscular fibre, with its fever and sour sweats, point unmistakably to this disease;" and one of its leading indications is that "the pain is increased by motion." On the other side of the question there is a remedy—Rhus Toxicodendron, which is adapted for that form of rheumatism where the symptoms "come on with severity during repose, and they increase as long as the patient remains quiet, until at length their severity compels him to move. Now on first attempting to move he finds himself very stiff, and the very first movement is exceedingly painful. But as he continues to move, however, the stiffness is relieved and the pains decidedly decrease, the patient feeling much better."

Again, another difference between these two remedies is that while bryonia is peculiar to rheumatism aggravated by dry, cold winds, that of rhus is intensified by wet weather. Such are a few of the indications by which symptomatologists are guided, bearing in mind all the same, that unless they also are accompanied by others in order to form a complete picture of the pathogenesis they would not be suitable; but in the majority of cases where these leading symptoms are present, it will be found that the concomitant ones are present also.

I cannot of course form an opinion as to whether I shall succeed in making any impression upon your minds as to the feasibility of the system I have endeavoured to bring before your notice, but already I have occupied too much time, and must content myself with thanking you very heartily for the patient hearing you have afforded me.

Discussion.

Mr. W. HUNTING said he rather regretted when Mr. Hurndall sat down, because he really made his subject so interesting that there was no difficulty in following it. There was a sort of flow and rhythm in his ponderous sentences and in his elocution that did one good, and produced a kind of feeling that one could sit there with pleasure and follow him as long as he cared to continue. But it was a different thing altogether when he ceased, and one had to discuss his paper, for he had told them that the opposite party who did not quite understand—they said "believe in"—homœopathy, failed to do so because of their "ignorance, presumption and impertinence." At any rate, those were the three mild terms he applied to somebody who dared to say something not quite in favour of homœopathy. The "shallow-minded," too, was another term which he quietly threw at those who differed from him. Mr. Hurndall's attitude towards his opponents reminded him (Mr. Hunting) of an illustration he saw in *Punch* the other week where an artist asked his friend to give a candid opinion of his (the artist's) work, premising, however, that "Mr. So-and-So had the audacity to declare it a daub and I felt inclined to punch his head." This, of course, did not inspire the friendly visitor No. 2 with any particular desire to be candid on the subject of the picture before him. Still he (Mr. Hunting) would have the temerity to give some reason for the faith that was in him for not practising homœopathy.

Mr. Hurndall told them that there was one great objection to their system—the pathological system—and that was that there was no therapeutic rest in it—a sort of suggestion that homœopathy had arrived at a final rest. One of the beauties—Mr. Hunting supposed—of Mr. Hurndall's method was that he had obtained rest—finality. His (Mr. Hunting's) idea was that there was no finality in this world, and ought to be no rest, but that there was progress, and that they could only arrive at truth by very hard and

slow means. Further, his belief was that they were on that road; that they were working, through pathology, to arrive at truth. They did not want rest in their researches and they would gladly leave to Mr. Hurndall and those who thought with him any satisfaction they might derive from having, in their opinion, reached therapeutic rest. Mr. Hurndall asked what was the value of pathology as an assistant to therapeutics? There was this value, therapeutics was the final stage in the attempt to cure. He used the word "attempt" advisedly. They did not flatter themselves that they could arrive at the goal all at once, but they endeavoured to know something of the way there. If they could once understand the causes of disease and the changes which occurred in disease, it seemed to him they would be in a better position to cure the disease, to remove the changes or prevent them. Mr. Hurndall asked them to consider the position of the pathologist waiting for a *post-mortem* examination, and he pointed out what he conceived to be an awful waste of time occupied in the endeavour to diagnose a case properly. He asked why in the meantime did they not do as he did—give the animal something. Well, that of course was an easy thing to do. If a blind giant was in a room with a club and he was told that at the other end of the room there was a fight between a man and a wild beast, the giant might hit out and the chances were that he would kill one or the other; and so blindly hastening to give medicine, they might chance to do harm. Again, Mr. Hurndall's taunt that they had to wait for an autopsy before they could understand the nature of a case, was a little exaggerated. It was impossible for medical men and veterinary surgeons to make *post-mortem* examinations without learning some useful lessons from them. One did not make hundreds of *post-mortem* examinations without learning something about the nature of the disease; and even if one had only made half a dozen, that would in all likelihood assist him in diagnosing aright the next case he had to deal with. In the event of a correct diagnosis, pathologists at all events knew with what they had to deal. That was an advantage over the other side, whose sole guide was a set of symptoms. His experience of homœopathy was not great. He once met a homœpathic gentleman who kindly offered to diagnose a case for him and put him right. Well, he took him to the case and the homœopathist diagnosed it as consolidation of lungs. Then he (Mr. Hunting) asked him to treat it, and the homœopathist supplied medicine which was duly given to the horse according to prescription; and in order that the experiment should be properly carried out, relays of men were provided to attend to the animal night and day as long as it lived. The case was not like one of those cases of parturient apoplexy which, treated homœopathically, never died but always recovered. On the contrary, the case was one of those chest diseases of which allopaths unfortunately lost many. Well, after the horse in questiou died, he made a *post-mortem* examination, which disclosed no pneumonia but much hydro-thorax. It may be said that such a mistake of an individual cannot invalidate a general principle. Granted, but the difficulty is always present. The notion of the symptoms in the mind of a medical man and the actual symptoms themselves were somewhat totally different. No doubt the symptoms of the water in the chest were there, but his homœopathist did not see them. His diagnosis was pneumonia and he gave what he thought the proper stuff, and the treatment prescribed was carried out to the letter. And yet the animal died. And no wonder, because the homœopathist spotted the wrong thing. That was the weakness of homœopathy. Homœopathists required to be infallible, and he really believed that some of them were—at least they thought they were. Mr. Hurndall referred to rheumatism. Rheumatism was not a disease one could always diagnose in a horse. When they had a lame horse to deal with, they knew it was suffering from pain somewhere. Then this, it was a thousand to one if the ailment were rheumatism,

they had no other symptom to guide them. What were they going to do in a case like that? It was pain, not rheumatism. It was no use turning up a book to see what was good for rheumatism. They must ascertain what was good to alleviate pain in the leg and find something to give the horse. Well, that kind of thing was fitly described in his (Mr. Hunting's) opinion by the word "empirical," which Mr. Hurndall was so fond of applying to the system of those who endeavoured to find out what was wrong with the animal and adapted their treatment accordingly. As to neuralgia, he told them that they, under their system, would treat all cases of neuralgia alike. Mr. Hunting could not see that they would do so, but with Mr. Hurndall's system he could quite understand his treating all neuralgia alike as nervous pain unless he claimed to differentiate the kinds and causes of pain by the symptoms. Under the pathological system they endeavoured to discover the causes of this nervous pain. Sometimes they were successful, occasionally they were not. Then they were informed that bacteriology was no good and that Koch and Pasteur were failures. No facts or statistics, however, were adduced in support of this statement. Mr. Hurndall alleged that Koch claimed to cure tuberculosis. He did no such thing. He simply placed his investigations before the world—he merely worked to arrive at some knowledge of tuberculosis; and he (Mr. Hunting) thought they might safely say that Koch had added more to their knowledge of tuberculosis than all the homœopathic observers put together. Because Koch and Pasteur in their investigations and experiments had failed to reach the goal, that was an argument against them? As he said before, they had not reached the goal in anything in this world up to the present time. If they could do a little towards approaching the goal, a little towards bringing it nearer them, they were doing a great work. Their pathological researches would, they hoped, bring them one day nearer the goal they aimed at, but there was no finality in scientific research. Pathologists were travelling on the right road to get at the nature of disease.

It was very difficult to follow Mr. Hurndall's extreme generalisations, but when he left the abstract and came to the concrete the difficulty ceased. When he referred, for instance, to that dog with the tumours then they felt more at home. He treated with medicine a dog with two large tumours in the abdomen, and those tumours disappeared in fourteen days.

Mr. HURNDALL: Pardon me, I never said that.

Mr. HUNTING: In the report of the case I think it is so stated, but my memory may be wrong.

Mr. HURNDALL: The time mentioned is six weeks, you will find.

Mr. HUNTING: Very well, six weeks. The nature of the tumours has some little importance in the consideration of the subject, because there are one or two conditions which might have been mistaken for tumour in the abdomen. There might be some concretion of a temporary character in the bowels giving the symptoms of a tumour in the abdomen; and if that was not present, he still doubted the tumour theory, simply because those tumours were absorbed by arsenic in six weeks. Again, in this case, suppose for the sake of argument, there were no tumours but some enlargements of a temporary nature from which the dog would have recovered in six weeks whether it had arsenic or not, then the homœopath got out of the difficulty by saying those other symptoms were concomitant. But they were warned by Mr. Hurndall against trusting in names. Was not "concomitant" a name—and a very good one, because any symptoms they did not want they could call "concomitant." Mr. Hurndall said that the study—he (Mr. Hunting) did not recollect whether he called it a science—the study of symptomatic drug selection required deep thought. Yes, such deep, deep, far down and far away thought that he (Mr. Hunting) could never hope to attain. The subject was so deep, indeed, that it became obscure—so deep that nobody understood

it except Mr. Hurndall, who started his investigation before he studied medicine and surgery with the fixed resolve "I will understand it." Now, if a man started on any study in this world—theology in particular, and next to that homœopathy—with a resolve to thoroughly understand it, it was only necessary to read everything on the one side, and nothing on the other, and to regard as impudent and narrow-minded all who questioned the knowledge thus obtained. In that way a man might bring himself to believe in any mortal thing he liked. If they started to master a theory with a fixed determination that they would understand it, they would soon arrive at such a knowledge that they would understand that particular theory and nothing else. It was a remarkable thing that Mr. Hurndall should talk of natural law and the law of nature. Now, there might be one or two laws of nature which were really known, but he (Mr. Hunting) was not sure of that. Gravitation might possibly be one of those laws, but how in the world Mr. Hurndall came to call a practice of medicine, which was absolutely empirical, a law of nature he (Mr. Hunting) could not understand. And he also could not understand how he applied to the same thing which was a law of nature, the words "divine inspiration," which was exactly the opposite. A law of nature was something, he supposed, that human beings could understand; divine inspiration, on the other hand, was something they could not understand. Therefore, the second term was a better description of homœopathy than the first.

Professor PENBERTHY said that although he was suffering from a severe headache and was not in a condition to debate this subject as he should like, yet as he was a practiser of allopathy, and as they had heard such an impassioned diatribe against the utility of that art of which most of them were practitioners, he felt that it was his duty to say just a few words. As Mr. Hunting said, Mr. Hurndall had spoken in condemnation of Pasteur, Koch, and others without adducing any facts or figures in support of his animadversions. Professor Penberthy called their attention to the fact that the testimony of Pasteur as regarded anti-rabic inoculation had been investigated by Burdon Sanderson, Victor Horsley, Sir James Paget, and other gentlemen of like repute and undoubted veracity, and they had given unqualified adhesion as to the effect of the practice as carried out by Pasteur. He would add no words of his own as to the value of Pasteur's discoveries and practice. They would have no weight in conjunction with the opinions of the eminent men whom he had mentioned; but he did say that when they were confronted with unsupported statements on points like these, as they had been that evening, they had a right to rise and call for proof. Mr. Hurndall was a personal friend of his. He admired him because he had the courage of avowing his convictions, and he had the greatest respect for his personal character; but when he quoted Professor McFadyean and Dr. Wilkes in a way which left the implication that they held that therapeutics had not been advanced by pathology, he was bound to protest against this. Professor McFadyean said in his (Professor Penberthy's) hearing, that perhaps therapeutics had not advanced at the same rate as pathological knowledge, and Dr. Wilkes, in his able address on medicine, could not be said to allow that the knowledge of therapeutics, as practised by all allopaths, had not been very much assisted, and did not very largely depend upon their knowledge of pathology. He (Professor Penberthy) as a lecturer on therapeutics, felt it to be his duty to try and study all the systems on which medicines were applied. He went to the headquarters of the homœopaths in England, and asked for their literature. He got it,—he got all he could. The first book he opened was by a graduate of Oxford, an M.A. and M.D., he thought his name was Dr. Sheldon. In this book, a small one, the writer, in order to illustrate the principles of homœopathy, adduced the

action of a little material taken from a cholera patient, and he put that side by side with an infinitesimal dose of arsenic. When he read this, and found a leading light of homœopathy comparing cholera virus with arsenic, a living thing, which had the power of multiplying itself infinitely, with an inorganic dead mineral, which had no power of increasing itself one iota, then he arrived at the conclusion that argument in this book was absent. And when he heard such statements as had been made about the cure of disease when treated on symptomological or any other principles, such as parturient apoplexy, and others whose pathology he did not understand, he was bound to say the practice of some gentlemen was most peculiar. They were told of the dispersion of tumours which were not diagnosed, and which were carefully said not to have been diagnosed in a public print, which tumours gave rise to the acute symptoms described, and yet were dispersed by a small dose of arsenic in the course of six weeks! It was said that in four days after the administration of the arsenic, there was evidence of the tumours beginning to diminish. He should like to know by what process any diminution in size could be noticed in four days of two tumours, one of which was the size of a hen's egg, and the other smaller. (A voice: "A divine process.") Well, he would confine himself to human observation. He asked Mr. Hurndall whether his natrum muriaticum was chloride of sodium, which effected this cure when the bread was gone? One bread might be made with a smaller amount of salt than other bread, and he could quite understand that allowing the pure matter of fact to be dependent upon the administration of the homœopathic drug, one could see that it was a homœopathic remedy merely affecting the cause, and preventing the fermentation. He himself hardly recognised this material under the name of natrum muriaticum, but he allowed it was more imposing, if not more potential. Then, again, a knowledge of bacteriology might be utilised in some other way than by obtaining cures for disease. The patient study of disease from every point of view was the surest way of arriving at the truth. The study of symptoms were not neglected, but were only a part of the methods adopted by allopaths. Despite all that had been urged, he thought it was rational, and he was glad that word was applied to their system, which aimed at finding and removing the cause. Such a course was, in his opinion, truly scientific and truly rational, and he should still continue to practise medicine with the endeavour of discovering the cause of the diseases he was required to treat. As to referring to text books, he was glad that they took such an interest in their cases as to have recourse to those books, and that they admitted they might gain knowledge from the experience of others. They believed that each individual case was to be treated on its individual merits, and they knew that disease was not likely to manifest precisely the same symptoms in every individual. The idiosyncrasies of animal bodies and tissues were to be taken into account, and the aggregation of these symptoms, leading up to the cause of the disease, should, in his opinion, be their great study; and how they were to arrive at this knowledge unless by *post-mortem* examination he, for one, could not tell. Of course, there might be one very good reason for the homœopath disregarding pathological knowledge. It seemed that they very rarely had the opportunity of making an autopsy. If they read their works, they would find that their cases were nearly always cured. So many cases, so many cures! Hence the opportunity for a *post-mortem* examination did not occur. They were rational from that point of view. Notwithstanding all his differences, he felt bound to say as an allopath, he, like Mr. Hunting, had enjoyed the reading of Mr. Hurndall's paper, which was absolutely clear, and which he (Professor Penberthy), believed expressed the thoroughly honest opinion of its author. He felt very much indebted to Mr. Hurndall—as he was sure the other members did—for having prepared so interesting a paper.

The CHAIRMAN suggested that, as the hour of adjournment had arrived, it would be better, perhaps, to defer further discussion until the next meeting. Meantime, members would have an opportunity of reading the paper in print, and would be thus more competent to debate it. This suggestion was adopted, and the meeting terminated.

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING of this Association was held on the 8th August, at the Grand Hotel, Birmingham, the President, Mr. T. H. Merrick, being in the chair; and among those present were Messrs. W. Carless, Malcolm, Trigger, Bainbridge, Burchnall, Proctor, Olver, Tipper, R. Cartwright, J. E. Cartwright, J. Blakeway, Thompson, Chambers, Warmington, Prickett, Butcher, Crowhurst, Wartnaby, Huband, Collett, H. J. Dawes (hon. secretary), and others.

The PRESIDENT nominated Professor Macqueen as an honorary associate of the Society. He thought that all who had attended their last meeting at Northampton had had great pleasure in listening to the address of Professor Macqueen.

New Members.

Messrs. G. Watson Lamb, Walsall; Percy C. Woolston, Bedford; and G. Alton, Burton-on-Trent, were elected members.

Vet.-Capt. Smith's Expanding Shoe.

Mr. OLVER said, in accordance with the desire of some of the members, he should like to say a few words with reference to the use of Professor Smith's shoe for expanding the heels of horses with contracted feet. He received the pattern shoe from Captain Smith (produced), and had one made from it to apply to a valuable hunter which had gone so lame that he could scarcely put his foot to the ground. After a fortnight's application, and by the assistance of the double screw in the shoe, the heel was forced out. Then the horse was put to work with the shoe on, and he had hunted the whole of the last season in a perfectly sound condition. There was no doubt that in this case the contraction was caused by pressure on the laminæ, and, by the expansion of the shoe, that pressure was removed and a complete cure effected, the foot developing to its normal size and shape in every respect. The shoe was an absolute success in his hands in this case.

Mr. TRIGGER asked if Mr. Olver could say anything more about other cases, or was this an isolated case in his experience?

Mr. OLVER replied that that was the only case he had tried. In reply to further questions, he said he could not say what the cost of such a shoe was. He could not say what was the measurement to which the foot had been expanded by the shoe, but he gradually widened the shoe by means of the screw each day, and the horse was at work in a fortnight, and the shoe was kept on two months.

The PRESIDENT: Such a shoe as that could not be made under a couple of pounds.

Mr. OLVER: Quite so; but the horse was worth a hundred guineas, and if it had not been cured it would have had to be shot. The foot had not contracted since.

Mr. TRIGGER said that it was the duty of a Society like theirs to investigate such appliances as this. They were a rich Society, and he did not think one case sufficient proof for them to decide upon. In this case it appeared that the cure was due to the patent shoe, and he thought the Society would do well to obtain a dozen of these shoes, to be given to the members who wish to try them and report as to the results obtained. He moved a resolution to that effect.

Mr. OLVER did not think Captain Smith had any quantity of the shoe made; he had lent him this one as a pattern, and he got a blacksmith in his town to make one from the pattern to fit the horse it was to be put on.

The PRESIDENT said he could get shoes made to this pattern of the sizes required in each case.

Mr. OLVER said each shoe to be used must, of course, be made to fit the foot.

Mr. PROCTOR seconded Mr. Trigger's motion, and he would have great pleasure in testing the shoe. The one case brought forward by Mr. Olver was very good as far as it went, but this was a very expensive shoe, and it would require to be very thoroughly tested before it would be generally adopted.

Mr. OLVER said that Captain Smith would not object to the Society having some patterns made for the use of the members, but his permission would, of course, have to be obtained first.

The PRESIDENT agreed with Mr. Olver. He added that in his experience a good many cases of foot lameness were really knee lameness.

Mr. BLAKEWAY said that one pair of pattern shoes would be sufficient for the use of the Society.

Mr. MALCOLM said that those present were indebted to Mr. Olver for bringing forward Captain Smith's shoe, and giving the Society the result of his experience. It was only just to Captain Smith that when such good results as Mr. Olver had told them of were obtained, they should be made public, and he cordially agreed with Mr. Trigger's motion. In conversation with Captain Smith at the Manchester meeting, that gentleman had remarked how unsatisfactory it was to him when he recommended members to try various things, as he could never find out the result of the trials. In this case, by Mr. Olver's report, that difficulty was removed, and he felt sure Captain Smith would welcome the further test now proposed.

Mr. DAWES asked who was to have the custody of the pattern shoes.

Mr. CARLESS said Mr. Olver expressed the opinion that the best way would be to leave them in the hands of the hon. secretary to forward to members who applied for them.

Mr. OLVER said that half a dozen pairs would be sufficient for all purposes, and that they be added to the instruments already belonging to the Society.

The PRESIDENT: Each member receiving them was to report as to the results obtained from using them?

Mr. OLVER: Certainly.

After some further discussion, it was ultimately resolved "That subject to Captain Smith's consent, half-a-dozen pairs of his patent expanding shoes be obtained, and placed in the hands of the hon. secretary for use as patterns by members, each member applying for a pattern to report either by writing or verbally at the meeting of the Association, as to the result obtained by him from the use of the shoe."

Mr. BLAKEWAY, F.R.C.V.S., Birmingham, then read the following paper on

"THE PHYSIOLOGICAL AND PATHOLOGICAL SOUNDS OF THE HORSE'S CHEST."

Mr. President and Gentlemen,—Whenever a man ventures to give hints or offer advice to others, he lays himself open to a charge of both arrogance and presumption, unless he can bring forward a good reason for fancying himself qualified for the task, for it not merely implies, but plainly shows that he conceives he knows more about the matter than the generality of those for whose consideration he submits his remarks. It therefore becomes not only a matter of proper respect to them, but a duty he owes himself to explicitly state that, in offering his suggestions and hints, he does not consider his qualifications for the task to arise from any fancied superiority or particular

perspicuity of intellect. I feel that I stand in the delicate position I have described, in venturing to lay before this meeting my few scattered remarks. There are beyond doubt many gentlemen present who possess more knowledge of, and have had more practice in the matter contained in this short paper than I can boast, and I am equally willing to give them credit for being able (if they feel inclined to do so), to lay their experiences before the members of this Association in better form and terms than I can, and it is simply in the hope of rousing that inclination, that at the request of our President, I consented to produce these notes. The first thing that presented itself to me was, what subject to take for my theme; and looking back at the able addresses we have had of late years, and the multitude of subjects they embraced, it became a matter of some consideration to decide upon a suitable one; finally, gentlemen, as you will see by your agenda papers, I hit upon "The Physiological and Pathological Sounds of the Horse's Chest." In the first place, I was anxious to deviate as far as possible from the well-trodden ground of splints, spavins, side bones, &c. Then again, this was a subject I was desirous of further investigating, with the view of increasing my own knowledge, and felt I would be likely to do so not only from arranging and stating my own information, but particularly from the good discussion I trust I may be fortunate enough to provoke.

Now, I do not for one moment maintain that we veterinarians can be expected to diagnose the various stages of chest disease with anything like the accuracy medical men can and do; the odds are against us in such matters as position of patient, muscular thickness, surrounding noises, &c., &c., but I do think we can improve upon our present position; for, taking myself as an average practitioner, I know I used frequently, when called in to treat chest affections, apply my ear to the side or sides, notice a little abnormal sound and respirations accelerated, sum the case up as pneumonia, apply stimulant to sides, with usual febrifuges internally, and the thing was done with. I am persuaded that is a state of affairs which has existed in, I was going to say many, but rather than tread on anyone's corns, I will say several men's practices. My object in compiling this paper is to find out, or rather endeavour to produce a discussion that will show us how far we are in a position to accurately differentiate between the abnormal sounds accompanying the various chest disorders of the horse.

Before going further it may not be out of place to just run over the physiological, or normal, state of affairs. If the ear or stethoscope be applied over the trachea of a healthy animal, tubular blowing or bronchial respiration is heard, a sound as of air blown to and fro through a tube, and with a moderate velocity; the mechanism of the sound being the entrance and outflow of air currents through the narrowed glottic aperture of the trachea, producing sonorous vibrations within the tube below. As the ear is passed downwards to the first piece of the sternum, the same sound is still heard, but more distant and muffled, and finally it becomes obscured by the *vesicular pulmonary sounds*, into the production of which it necessarily enters.

The pulmonary vesicular breath sound is produced by the friction of air entering the air sacs from the minute bronchioles, and it is supplemented by the conduction of what remains of the glottic breath sound, now infinitely subdivided. During calm breathing the sound accompanying *inspiration* is soft and breezy, even in intensity from commencement to near the end, when it fades without perceptible interval into the expiratory sound. The *expiratory* sound commences at the moment inspiration ceases, being continuous with the inspiratory sound, but it rapidly fades in intensity, ceasing to be audible after the first third of the expiratory act. Of the time occupied between the commencement of one inspiration and that of the next, the inspiratory act occupies nearly one half, the expiratory act the remainder,

with the exception of a very brief interval of pause between the end of expiration and the commencement of the next inspiration. When the expiratory sound is audible through a longer period of the act than natural, the expiration is said to be *prolonged.* If the respiration be hurried and forced the inspiratory sound is coarser and louder and the expiration more audible, the sounds approximating to the *puerile* or *juvenile* breathing, which is normal to young animals, and due to the air cells being more numerous and smaller and the entire pulmonary tissue being more elastic in nature. Dr. Taylor says in respect to hurried respiration, "it is louder and harsher than the normal breath sound, and the expiratory murmur is almost or entirely suppressed." In health, the vesicular breath sound should be about equally well heard over both sides of the chest, allowance being made for additional thickness of covering over certain regions. In the horse we may take it that about two-thirds of the chest are exposed for auscultation; from behind the scapulæ and elbows, the murmur slightly increases in force to the tenth or twelfth rib, thence becoming diminished; on the left side in the lower third the pulsations of the heart interfere with its detection.

I do not purpose treating of the *percussion* sounds in this paper, but simply those heard in auscultation, and as you are aware auscultation may be performed in two ways, by direct application of the ear to the chest, when it is termed *immediate*, or a medium may be used between the ear and the part under observation, when it is termed *mediate* auscultation. It is generally considered by veterinary practitioners that the direct application of the ear to the chest is better than auscultation by an intervening instrument, and I do not wonder at it, as the stethoscopes used by medical men and sold by veterinary instrument makers are practically useless, at least so far as the horse is concerned, and of course the same applies to a cow; however, I will now introduce to your notice an instrument I got made the other day that *is* useful, and with it I am satisfied I can detect the chest sounds better than with the naked ear—to say nothing of the comfort of the thing, for it matters not whether your horse's sides are clean or dirty or what position he is in.

The pathological thoracic sounds distinguishable are either such as may be viewed merely as altered normal, or morbid sounds, and adventitious, or sounds added to the ordinarily existing ones, and of a different character.

Morbid Respiratory Sounds.

Puerile, compensatory, or supplementary breathing, is characterised by increased loudness or vesicular breath sound, with some prolongation of expiration. Besides being audible over the chest generally in healthy *young* animals, this exaggerated breath sound may be heard over certain portions of the chest, when some other part is disabled or diseased—for instance, with effusion of fluid into one pleura (this, of course, does not apply to the horse, on account of perforation of posterior mediastinum), the respiratory sounds over the opposite side are exaggerated or puerile, to make up for deficient function in the affected part, this is termed compensatory or supplementary breathing.

The breath sound may be enfeebled over the whole chest, as in cases of emphysema (broken wind) or thoracic muscular debility.

Localised enfeeblement of breath sound may be due to various causes, viz., local emphysema, adherent and thickened pleura, blocking of the alveoli by catarrhal products, and closure of bronchial tubes by plugs of mucus. If the rest of the lungs be free, this local enfeeblement is made up for by compensatory breathing on the opposite side, or in other parts of the same lung.

Suppressed breath sound signifies removal of lung from the surface by effusion of air or fluid into the pleura, or occlusion of a main bronchus by compression or morbid growth.

Wavy or jerking respiration are terms characterising a kind of respiration in which the respiration is either partially or completely interrupted several times. The expiration is rarely thus affected. Waviness of respiration may be due (1) to an irregular action of the inspiratory muscles, not common in our patients, but frequently met with in nervous people; (2) to cardiac impulse, in which case these interruptions are rhythmic with the heart's pulsation; (3) unequally distributed impairment of the lung elasticity, for example, in early tubercle deposits, pleuritic adhesions are said to have the same effect. Waviness of breath sound may occur independently of any organic change, and requires other signs to render it of any value in diagnosis. Jerking respiration of interrupted breath-sound is more commonly due to organic lesions of the third kind mentioned.

Cogged breath sound is a term applied to a form of interrupted respiration, in which the interruptions are very even, three or four to each inspiration. It appears to be due to obstruction in the smallest bronchioles, either by dryish secretion, or small nodules of tubercle, requiring some accumulation of inspiratory force to overcome it. The sounds commonly give place to a bubbling râle.

Harsh or rough respiration with prolongation of expiration implies a want of vesicularity in the sound. Whilst vesicular breath sound has been compared to the sound produced by the breeze passing through leaf-laden trees, harsh breathing on the other hand resembles a similar breeze traversing their naked branch tops. Some prolongation of the expiratory sound is inseparable from harshness of breath sound. Harshness of breath sound by no means implies increased loudness—rather the contrary. Enfeebled respiratory murmur is commonly harsh—always so when due to alveolar obstruction. The meaning of harshness of breath sound is simply commencing consolidation; in the human subject, it goes with incipient dulness, and is one of the earliest signs of apex disease in consumption. There can be little doubt that its real mechanism depends upon the extinction of the vesicular part of the normal breath sound, and the better conduction of the glottic sounds, which at peripheral parts of the lungs are usually muffled and obscured by the vesicular sounds. The prolongation of the expiration is very characteristic of this early alteration of the respiratory sounds, and it may be mentioned in passing, with regard to *morbid* breath sounds that the *expiration* is the most important part of the respiratory act to attend to in auscultation.

Divided respiration, frequently described as a separate evidence of disease, is really an inseparable factor of harshness of respiration. Instead of the two component sounds, inspiration and expiration, fading imperceptibly into one another, they are more or less distinctly separate, the more so as the more typical bronchial type of breathing is acquired. Deficiency of elasticity is the cause to which the division is usually ascribed; it is however a significant feature of glottic breathing. When vesicular murmur is displaced by divided respiration, there is always the pathological condition of inflammation; it may be simple, tubercular, septic, &c. Which is present? is the subject of further investigation, but *any* inflammation thickens the alveolar walls, and so diminishes their elasticity, and renders the change from the distension of inspiration to the collapse of expiration more difficult to perform.

Bronchial respiration is most typically heard over simple lung consolidation, as pneumonia at the base or apex. The sound is acoustically identical with that produced by placing the mouth in the position to pronounce the gutteral *ch* (as in choir or christian) and drawing the breath to and fro. The inspiratory and expiratory sounds are about equal in length, nearly identical in pitch, and distinctly divlded from one another. The sound varies in intensity and definition, from the most intense tuberlar or tracheal breath sound to the lower pitched and more diffuse blowing respiration (diffused bronchial breathing).

Besides hepatisation of lung this form of respiratory sound may be produced by other condensations of lung, for example, from pressure, or by tumours extending from the neighbourhood of a large bronchus to the surface, such as enlarged bronchial glands, mediastinal growths, and aneurismal tumours. The more diffused blowing sounds are due to less complete consolidation. It is essential that the bronchi be patent, in order that bronchial respiration may be heard, thus in cases of cancerous growth invading a lung from its root and occluding the bronchi no respiration is audible. As regards mechanism, however, it can scarcely be maintained that the sound is produced by the passage to and fro of air in the bronchi of the consolidated lung, for (1) at the period when bronchial breathing is most distinct, the lung is immovably fixed by exudation; (2) the play of the chest wall on the affected side is almost or quite restrained; (3) the air cells being occupied, there is no reason why air currents should penetrate the bronchi. Hence it would seem that bronchial respiration is but the glottic breath sound reverberating through the bronchial tubes and well conducted to the surface. Chauveau, in 1877, to prove this, took a horse with hepatisation of the base of one lung and bronchial breath sound over the part affected; he incised the trachea below the glottis and held the wound widely open; the bronchial breathing immediately disappeared, all respiratory sound ceasing over this portion of lung, whilst elsewhere the vesicular breath sound was unimpaired; he then inserted a musical reed into the wound, and the musical sounds were well conducted over the consolidation, but little audible over the healthy portion of lung. Bronchial respiration is also met with apart from condensation of lung tissue, being sometimes heard as an accompaniment of emphysema, in which, while the breath sounds are enfeebled as a whole, the expiration becomes relatively more marked, and therefore approaches the bronchial character. Dr. Bullar thus accounts for bronchial breathing—the lung being solid and motionless, the bronchi patent, it is the passage of air over these patent tubes that produces the sound like blowing across the top of a bottle.

Cavernous respiration, although not of much moment to us as veterinarians, may be just mentioned in passing. It's a breath sound in which the inspiration and expiration have both a hollow blowing quality. It is to the expiration that the hollow wavering quality characteristic of this breath sound is especially attached, and, as pointed out by Dr. R. Thompson, the expiratory sound is lower in pitch than the inspiratory. Cavernous breathing signifies pulmonary cavity, usually phthisical—(1) exceeding in size an unshelled walnut; (2) either empty or at least partlally so; and (3) communicating with one or more patent bronchial tubes. Softening of tubercle or caseous pneumonia, pulmonary abscess, or bronchial dilatation of sufficient size, are the most common causes of cavity in the lung. This abnormal sound is formed by (1) the passage to and fro of air into a cavity with the respiratory movements; (2) the conduction and modified reinforcement of the glottic respiratory sound within a cavity.

Amphoric breath sounds is a variety of cavernous respiration having the same characters, but on an exaggerated scale, that is necessarily exaggerated as regards loudness, but having all the qualities—blowing character and hollowness—intensified. This sound is heard over a large superficial cavity, either in the lung or between the pleura freely communicating with the lung. Its mechanism is identical with that of cavernous respiration, only that the size of the cavity is large, in fact it is the special characteristic of very large cavities, especially of pneumo-thorax, where the pleuræ are separated by air.

Adventitious Auscultatory Sounds.

The adventitious sounds of the lungs themselves may be divided into *rhonchi* and *râles*; they are both produced by impediment to the passage of

air through the lungs, from narrowing of the tubes. This narrowing may be caused by (1) an accumulation of mucus; (2) thickening of the lining mucous membrane; (3) spasmodic constriction of the muscular walls of the bronchi; (4) pressure of some tumour on the tube. It was formerly the custom to give each individual sound a specific name, as you are all no doubt aware from your frequent perusals of veterinary literature; and perhaps were equally as puzzled as I have been; thus, there were clicking râles, muco-crepitant, sub-crepitant, and so on; but by a general consensus of opinion such minute subdivision has been considered no help to diagnosis, and the following simple arrangement is now substituted:—

Rhonchi are the sounds heard in the large tubes; they differ amongst themselves according to the size of the bronchial tube and the extent of the narrowing. They are likened to the familiar sounds of cooing, groaning, snoring. grunting and whistling; the lower pitched snoring rhonchi are produced in the larger tubes and are termed *sonorous rhonchi*; the higher pitched whistling sounds are produced in smaller tubes and are termed *sibilant rhonchi.*

Râles are crackling or rattling sounds; they are heard in the small and medium-sized bronchial tubes or in pulmonary cavities; they are produced by air forcing its way through secretions, thus causing bubbles to form and burst with a slight noise. They are moister in character than the rhonchi, which are sometimes termed in contradistinction to râles, *dry* sounds. Râles differ according to the size of the bubbles, and are called *small*, *medium*, and *large*; they are also divided according to the character of the sound into bubbling and crackling. *Crackling râles* have a sharp, clear, ringing, explosive character, which is probably due to their occurrence in consolidated lung, which, therefore, conducts the sound better; *Bubbling râles* are dull, not ringing or explosive, and occur in tubes surrounded by normal tissue. So that râles are divided according to their character, into bubbling and crackling, and according to their size, into small, medium and large. The very smallest of râles are termed *crepitating râles* or briefly *crepitation*; they can be very well imitated by rubbing the hair between the finger and thumb, close to the ear, by rustling of silk, and by rubbing the palmar surface of the finger on unplaned wood; they occur in the first stages of pneumonia and in œdema of the lung. In the latter stages of pneumonia the râles get slightly coarser and moister, and the term then applied is *redux crepitation*, which is of course only a very small râle. *Crepitation* and *redux crepitation* are produced by the reopening up of minute bronchioles, the lining membrane of which has become adherent by the sticky exudation which occurs in pneumonia. Crepitation and the smaller râles are only heard during inspiration, the medium-sized and larger may be heard during both inspiration and expiration.

Pleural sounds, the sounds originating in diseased conditions of pleura are "friction sounds." The pleuritic rub of dry friction, is a wavy or uneven rubbing sound, heard close under the ear with both inspiration and expiration, but chiefly with the former, unmoved by cough, and usually attended with pleuritic pain. We may fail to obtain this sound through the animal involuntarily restraining the movement of the affected side, on account of the pain. A deep inspiration should therefore be caused by covering the nostrils with the hand for a few seconds immediately after expiration has taken place. In well marked cases the friction is very loud and leathery, and, it is stated, may be preceptible to the hand applied.

It is sometimes difficult to determine whether the sound heard is the friction sound of pleurisy, or the crepitating râle of pneumonia, but it should be remembered that the surface of the lung cannot be inflamed without the pleura covering it sharing also in that inflammation, and therefore giving its

own physical sign. Pleural friction may be regarded as a dry sound, seeing it is only recognised prior to the condition of effusion, and becomes inaudible with the existence of fluid in the chest, the sounds abruptly ceasing at a certain height from the floor of the thorax, indicative of the height to which the fluid has extended.

(To be continued.)

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE summer meeting of the above society was held at the Salutation Hotel, Perth, on 30th June.

There were present:—Professor W. O. Williams, President; Messrs. Clark, Coupar Angus; Thomson, Aberdeen; Constable, Inchture; McLauchlan Young, Dundee; Peddie, Smail, Carruthers, McArthur, Johnston and Connacher, Perth; Durkie, Dundee; Inglis, Forfar; and Moir, Edinburgh.

Mr. W. Carruthers, Perth, was nominated for membership of the Society.

The President referred to his election, to the position he now held, to the last meeting of the Society, and expressed the pleasure he felt in proposing a vote of thanks to his predecessor, Mr. Clark, of Coupar Angus, for the very able way in which he had conducted the business of the Society for two years. The Society had prospered in his hands, and he (Professor Williams) hoped that Mr. Clark would long be spared to give the Society the benefit of his great practical experience.

A paper was then read by J. McLauchlan Young, M.R.C.V.S., on "Bacteriology," with special reference to Anthrax. In the discussion which followed,

Mr. CLARK, Coupar Angus, endorsed the remarks of the Chairman as to the ability of the paper by Mr. Young. He said it was evident to every member, especially those of the older school, the utter impossibility of veterinary surgeons carrying out in every-day practice any application of the theory which had been explained. If such were done, he was much afraid that the yearly returns would not be of great moment. He thought it was perfectly patent this investigation must rest in the hands of a very few specialists. But what he would like to say more particularly was in reference to the Contagious Diseases Act, and as it had been demonstrated by the Board of Agriculture. The Government had now offered compensation to half the extent of the value of the animal killed. They had at least given the power into the hands of the Local Authority to compensate. That was all very well. But it was perfectly clear to himself and many others that in Forfarshire and Perthshire there had been a considerable number of cases since the passing of the Act that owners had not time to give notification of disease. Animals became affected, the owners sent for an inspector, but before he arrived the beast was dead. That was an extremely great hardship. Another matter that ought to be brought under the notice of the Board of Agriculture, was that of animals dying suddenly from any disease. His opinion was that the cause of death ought to be properly ascertained, and to give compensation at least as the value of the carcase and hide. In that way a great many more cases of anthrax would be found than there was at present. He knew within his own knowledge of one case where an owner of an animal, without ascertaining the cause of death, buried the carcase in a hole. These were questions of great concern to veterinary surgeons and the country, and until the Board of Agriculture took them up they would still have obscure cases of anthrax.

A vote of thanks to Mr. Young was cordially given, and the proceedings shortly afterwards terminated.

PETER MOIR, *Hon. Sec.*

THE NEW VETERINARY COLLEGE, EDINBURGH.

On September 6th, the customary introductory address at the opening of the New Veterinary College, Edinburgh, was delivered by Principal Williams. There was a large attendance. Captain Moore, A.V.D., presided, and among those present were Lieutenant-General Fremantle, Professor Ivison Macadam, Miss Burton, and others.

Principal Williams, who was very cordially received, said the students who were there for the first time that day would be under a new system, because they would have to remain at the college for four years before they could present themselves for the final examination. That was a great jump. When he was a student two sessions were considered enough, and he thought when they looked back upon the men of that time they would admit that in those days they made very fair veterinary surgeons. Afterwards they extended the curriculum to three years, and he thought they had done very well indeed then. Now it was extended to four sessions, and unfortunately he was at variance with those who fixed that period, because he thought the extra fourth year was entirely lost. The fourth year was to be wholly devoted to pathology; and to insist upon that extra year was, in his opinion, to waste time, because a year was not necessary for the study of pathology alone. Further, he objected to the extension of the curriculum because it involved extra cost in college fees, and because the incomes to be derived from the practice of the profession were altogether disproportionate to the amount of the college fees. In other words, the time of study was totally out of proportion to the income received by the practitioner when he went before the world. The students, too, from the present time would be under the new examination system. He did not think that the veterinary surgeon could be too highly educated, but still he had the same objection to the new examination system that he had to the extended curriculum—in view of the subsequent income which students might expect to enjoy, he thought the education now insisted on was too high. Proceeding to speak upon matters which were of interest to the public as well as to the profession, Principal Williams touched upon the subject of louping-ill in sheep. Thirteen years ago, he said, he had investigated the disease, and he certainly had found a bacillus—an organism—in louping-ill. He noticed that Mr. Klein had reported that he had discovered an organism a few days ago—whether it was the same organism that he (Principal Williams) discovered years ago, he did not know. Some short time ago he happened to be in Argyleshire, and in examining some sheep there, he had found the same tick—the same organism—that he discovered thirteen years ago. He had come to two conclusions—that these ticks were the intermediate bearers of the disease of louping-ill, and that the disease was not an infectious disease which could be communicated from one sheep to another, but was one communicated by inoculation by a tick. Where the tick came from he could not see. Grasses had nothing to do with conveying the disease to sheep; they only afforded cover to the ticks. Subsequently the principal dealt with the subject of the restriction, on account of the supposed danger of introducing pleuro-pneumonia, on the importation of Canadian cattle. The restriction, he thought, was the greatest farce, because anthrax was not a contagious disease in the true sense of the word. Anthrax could be inoculated from the body of an anthrax animal to a healthy animal, but except by that inoculation it was non-communicable, and to destroy animals that had been simply in contact with others suffering from anthrax, was just to waste public property. If local authorities, instead of paying money as compensation for these slaughtered animals, were to provide a proper apparatus for the destruction of carcases of diseased animals, they

would be going in the right direction. If local authorities were to provide cremators for the destruction of anthrax carcases, then anthrax would soon disappear. For years he had watched that question, and he had never seen one case of pleuro-pneumonia among American or Canadian cattle. So far as he had seen, there had been no pleuro-pneumonia introduced into this country through cattle from Canada or the United States. Mr. Gardner and his advisers were going upon a wrong foundation, because they were keeping out of this country cattle which legally ought to be allowed to enter this country.

The CHAIRMAN, in the course of some remarks, said he was at one with Principal Williams on the subject of pleuro-pneumonia in relation to Canadian and American cattle.

On the motion of Lieutenant-General LYON-FREMANTLE, the principal was cordially thanked for his address, and on the motion of Lord PROVOST RUSSELL (who as well as Councillors Hay and Hunter had joined the meeting after it opened) Captain Moore was thanked for presiding.

THE ROYAL (DICK) VETERINARY COLLEGE.

THE seventy-first session of the Royal (Dick) Veterinary College, Clyde Street, Edinburgh, was opened on September 6th, with an address by Professor Chiene. Lord Provost Russell presided, and among others present were ex-Councillors Turnbull and Drybrough, Councillors M'Laren, Cranston, and Waterson, and Principal Walley. The Lord Provost, in his opening remarks, said that the College had proved an important factor in medical education in Edinburgh, and had conduced to the training of many men who had been useful in the world, and who had brought credit to themselves and distinction to the College and the city in which it was placed. The institution was as prosperous as ever it was, and appeared to be still increasing.

Professor CHIENE, at the outset of his address, adverted to the founder of the College, whom he described as the pioneer of systematic veterinary instruction in Scotland, and he urged the students one and all to take William Dick as their model. He was there, he said, to intensify the close relationship of the veterinary work with his own, and he took as an illustration the most important, zoogenous—those diseases communicable from man to animals and from animals to man. He chose it because of its immense importance. More deaths occurred from tuberculosis in the country than from all the zymotic diseases put together. It was so infectious that many desired to have it scheduled under the Notification Act. How, he asked, were they to prevent its appearance and spread? By rendering the tissues of children and animals inept for the growth and development of the organisms, by improving the condition of houses and byres, the free use of sunlight and air, and of antiseptics, and by preventing the use of tubercular milk and food. His opinion was that their only safeguard was frequent inspection, and that the inspection must be by skilled inspectors. It must be placed entirely in the hands of the veterinary profession. As this College had led the van under William Dick in systematic veterinary instruction, so the time had now come when they must have originating from this school a diploma in veterinary hygiene analogous to the diploma or degree in public health which now stamped the medical officers of health throughout the country. Discussing the question of compensation, he declared that the expense was a fleabite compared with the expense of the disease for which it was intended to give compensation. On the motion of Principal Walley, a vote of thanks was awarded to Professor Chiene for his address.

Notes and News.

CATTLE DISEASE IN WEST AFRICA.—From the annual report of the Administrator of the Gambia, we learn that early in 1892, a disease appeared amongst the cattle and destroyed all (thousands) for hundreds of miles round Bathurst. It will, the Administrator adds, take years for the colony to recover from this terrible epidemic, and beef is very difficult to get in the market.

ANTHRAX IN THE UNITED STATES.—The Illinois State Board of Live Stock Commissioners have returned from Edwards County, where they went to investigate a disease which is carrying off live stock at an alarming rate. Dr. Trumbour, State Veterinarian, readily recognised the disease as anthrax, which has probably killed 500 head of cattle in Edwards, Clay, and Wayne Counties, since its appearance two or three weeks ago.

FOOT-AND-MOUTH DISEASE IN ROUMANIA.—A serious outbreak of foot-and-mouth disease has occurred in the Roumanian Dobrudscha. Energetic measnres have been adopted by the authorities. who have ordered the slaughter of large numbers of cattle. The disease is stated to have been successfully dealt with in the Dobrudscha, but it has spread to the districts north of the Danube. The Government has prohibited the holding of cattle fairs in many departments of Southern Wallachia owing to the prevalence of this epidemic and of cholera.

EGYPTIAN HORSES.—Referring to the present condition of the breed of Egyptian horses, Mr. Alban, our Vice-Consul at Alexandria, in his last report, says that an attempt has recently been made to improve it, and for this purpose a Government commission was appointed last year. Pure breed Arab stallions have been purchased and stationed in various districts. Horse shows have been held in these districts, and a large number of certificates have been delivered to the owners of such mares as were considered by the commissioners to be sufficiently sound and promising, entitling them to the use of the Government stallion stationed in their district. Almost all horses in Egypt are of Syrian origin, and Egypt is dependent for her supplies on Syria. The exportation of horses from Syria is frequently prohibited for varying periods by the Turkish authorities, which results in an inconvenient scarcity and dearness. Mr. Alban hopes that continued efforts will be made to encourage horse-breeding in Egypt.

THE STAYING POWERS OF BOSNIAN HORSES.—The Bosnian Government recently instituted a race of 180 miles through a mountainous country in order to test the endurance of native horses. The start (says the *Standard* Vienna correspondent) was made early on Tuesday morning, when 47 riders put in an appearance. Nineteen of the number were officers of the Austro-Hungarian Army, 18 Bosnian landowners, nine officials, and one a private gentleman. Of the horses, 28 were of pure Bosnian breed, and 19 descendants of imported stallions and native mares. The best record was made by a Mohammedan landholder, who covered the distance in 30 hours 26½ minutes. The next 10 riders all performed the journey in less than 34 hours. Owing to the extreme difficulty of the road, these performances must be regarded as highly satisfactory. Every horse and rider had, within a small portion of the journey, to ascend a height of 2,751 feet. The first prize, which was given by the Austrian Emperor, consisted of the sum of 12,000 kronen. Several of the competitors retired from the race after completing only a fraction of the distance. Three horses dropped dead on the road.

THE PASTEUR INSTITUTE.—The return of the work done at the Pasteur Institute during July gives the number of persons under treatment as a preventive against hydrophobia as 156, of whom 139 were French and 17 foreigners. Of this total, five had been bitten by animals experimentally proved to be mad, 102 by animals declared by veterinary certificate to be mad, and 49 by animals only suspected of being so, the bites having been inflicted in 140 cases by dogs, in 15 by cats, and in one by a sheep. One death is reported as having occurred, that of Melchoir Mermont, a workman on the public roads in Upper Savoy, who was bitten on July 11th by a dog which, after a *post-mortem* examination, was declared to be mad. There were ten bites on the left hand, three of them being very deep, and Mermont was under treatment at the Pasteur Institute from July 18th until August 6th. Upon the latter date he complained of cramp and pricking pains in his left hand, and it was seen that this hand and the arm were partially paralyzed. He did not, however, seem depressed, and made a fairly good meal before going to bed, though he complained that the paralysis was extending to the right arm. A short crisis occurred during the night, and he died in a few minutes. His relatives, unfortunately, would not allow a *post-mortem* examination to take place, so that it cannot be said with absolute certainty what was the cause of death.

THE RAPID GROWTH OF FUNGI.—Fungi grow almost everywhere—in houses, on wood, in the enclosed cavities of roots, in animal tissues; in short in and upon everything, while their rapidity of growth is not less marvellous. A blacksmith at Salem threw on one side a piece of iron, which he had just taken from the fire, and next morning he found on this very piece of metal, lying over the water in his trough, a mass of fungi 2 ft. in length; it had crept from the iron to some wood near, and not from the latter to the iron, and this immense mass had formed in twelve hours. The late Rev. M. J. Berkeley saw a species of fungus on a lead cistern at Kew, and Somerley found another species growing on some cinders on the outside of the dome of St. Paul's. The great puff ball will reach the size of a pumpkin in a single night, and Lindley, the botanist, calculated that the cells of which it is made up will multiply at the rate of 60,000,000 a minute. Dr. Greville records that a specimen of one of the largest British fungi, the Polyporus squamosus, reached a diameter of 7 ft. 5 in., and weighed 34 lb.; it took four weeks to get to that size, growing at the rate of 19 oz. a day. A specimen of this species has been known to have a diameter of 11 in. in a week. The late Dr. W. B. Carpenter, F.R.S., recorded an instance of the tremendous power which fungi exert in the course of growth. Basingstoke was, many years ago, paved, and some time later the pavement was found to be uneven. This unevenness increased until some of the heaviest stones were completely lifted out of their places by the growth of enormous fungi underneath. One of these paving stones was 22 in. by 21 in., and weighed 83 lbs. Dr. M. C. Cooke, of Kew, had a similar case brought under his notice—a large kitchen hearthstone being forced out of its bed by the growth of a fungus. Sir Joseph Banks related a still more startling occurrence: a cask of wine leaked, and after a time a fungus grew from the leakage, which finally filled the cellar and carried the cask up to the ceiling.—*Melbourne Times.*

Correspondence.

ANTHRAX AND ENDOGENOUS AND EXOGENOUS DISEASES.

DEAR SIR,—The London and local papers are almost daily teeming with "unaccountable" outbreaks of anthrax. Why all this mystery about an infectious disease, the bacillus which causes it being probably the best known of all, and its life history studied more than any other? I have here before me several cuttings from leading daily and weekly papers, with paragraphs like the following: *The outbreak (of anthrax) cannot be traced, as the herd, bought in January, has never been in "contact" with any other animals.* (London *Standard*, August 21, 1893). Similar passages to the above are also to be seen in the *Times*, *Globe*, *Daily Graphic*, and large numbers of local papers.

I am not a believer in the Compulsory Slaughter Bill for anthrax or swine fever, and I repeat the statement I made a short while ago in your journal: that if every animal in Great Britain were killed to-day, it would not exterminate anthrax. It would still be there in the soil. The friends of compulsory slaughter will refer to the great success with which foot-and-mouth disease, rinderpest, and, probably contagious pleuro-pneumonia have been eradicated, but they are referring to quite another class of disease. These and several others (as glanders, etc.) belong to the so-called contagious or "endogenous" diseases; while anthrax, swine fever, tetanus, etc., are infectious, or "exogenous" diseases.

Now what is the difference between an exogenous and an endogenous disease? Go at once to the life history of the germ, and in most instances it is not difficult to classify the disease. The germs (taking it for granted that the diseases are caused by germs) of most endogenous diseases with which veterinarians are acquainted, have not been discovered, but simply from a clinical aspect the diseases can be classified. In some endogenous diseases—as tuberculosis, although so far as is known the germs do not multiply outside the body, they live for an indefinite time; while the glanders bacillus cannot survive long external to the body. Touching, again, on the bacillus of tuberculosis some recent investigators go so far as to say that the bacillus changes its form outside the body in a similar manner to the actino in blood serum cultivations. If this is proved to be correct, it may put quite another light on our present views. Now we will touch on exogenous diseases, taking anthrax as our example. We have first to face the possible origin of germs. They are, as everybody knows, classified in the vegetable kingdom, and have undoubtedly originated external to the body; some have retained the double power of living in or outside the body (exogenous), both pathogenic and non-pathogenic; while others have almost, and in some instances entirely, lost the power of multiplying in, or living for any time outside, the body. Of course, many germs we cannot grow artificially outside the body, but at some future day this may be done.

This division may not be beyond objections, but in the present state of our knowledge of infectious diseases, the terms ex- and en-dogenous express very much more than is conveyed by the word contagion. The anthrax bacillus does undoubtedly live outside the body; in fact, it is only outside the body that spores are formed, and outside the body it retains, increases, or loses, its power of producing ptomaines, being also no doubt affected by the climatic and telluric conditions existing in the various localities.

The past season has evidently been very favourable to the anthrax bacillus, and according to the reports it has been playing great havoc (with the help of

the authorities) amongst the live stock of the country. The Compulsory Slaughter Bill will pass, I suppose, but it will never exterminate anthrax. If one half of the money paid as compensation during the first twelve months were spent in building and equipping a laboratory for original research with regard to infectious diseases, and placed in the hands of competent investigators, some means might be discovered of preventing anthrax.

Yours truly,

Stuttgart, Germany, *September 9th.* J. WILSON-BARKER, M.R.C.V.S.

(Such investigations as our correspondent suggests will come within the province of the British Institute of Preventive Medicine, which will be founded presently in London.—ED., *V.J.*).

MECHANICAL LAMENESS IN HORSES, OR CONTRACTED TENDONS *VERSUS* PATTEN SHOE.

SIR,—I have recently read with much interest a case of contracted tendon and spavin in a horse, recorded in a veterinary periodical, and I noticed that different veterinary surgeons hold different opinions as to whether such an animal was suffering pain whilst working, and whether such pain amounted to cruelty. The expression of these opinions excited within me a renewal of opinions I have held and acted upon for over half a century. In 1834, my predecessor, with whom I served my apprenticeship, was in the habit of using the patten shoe in these kind of cases, and he was at some pains in explaining to me its utility. I have continued to use it ever since. At the present time my firm, "Greaves, Faulkner, and Jones," has dozens, perhaps scores, of horses working regularly, at slow work, in comfort in the streets of Manchester, with patten shoes on, and I am convinced that such horses could not work at all, or only in pain and suffering without them.

The opportunities I have had of observation are many; the opinions I hold have been formed from practical experience—a rather extensive experience, when I say we are in the habit of shoeing over one hundred horses a day in our forges, and we have the supervision of the horses of two other firms, who shoe their own horses, of over five hundred horses each.

If we observe a horse with contracted tendons when standing still, he is constantly easing the leg, standing on the toe of the foot of the lame leg; it is evident every time the weight is put on this leg, and the heel is forced to descend to the ground, that he is put to pain, sometimes to severe pain; and when standing in his stall, if he can find a hole between the stones, he is sure to have the toe of the foot of the lame leg in it. This fact ought to teach us a lesson.

We know these cases commence by the fibres of the back tendons being suddenly over-stretched, commonly termed "sprained" or "strained" tendon; it may be only slight at first, and, in this condition, by rest and proper treatment, a cure may be effected, and be attended with only a very little lameness; but if this overstretching is repeated over and over again, whether the horse is engaged in slow or fast work, inflammation is set up, and the horse becomes lame enough. Or the commencement may have been sudden and violent; the lameness and inflammation may have been severe from the first, and not only the tendons, sheaths of tendons, and the tissues surrounding the tendons, but also the suspensory ligament, and the lower joints of the hock, may become involved. The degree of contraction, the enlargement, and the pain are always caused by, and is in exact proportion to, the degree of the

inflammation; perhaps the hereditary predisposition may in some cases have a tendency to cause a weakness in these parts, but whenever contraction and enlargement have become established, in these cases treatment is unavailing.

You may bleed at the toe, give physic, have the leg in a tub of hot water two or four hours a day, for days or weeks; or the cold water douche with the pipe for hours daily for days or weeks, then blister with cantharides or biniodide of mercury, then fire over and over again, and give four or six months rest; but you can do little or nothing in reducing the enlargement or the contraction. The horse may have improved in his lameness, but put him to work with ordinary shoes on, and in a little time he will be as bad as ever again, simply because his weight is put upon this leg, the heel of the foot is forced to the ground, and the fibres of the tendons, which are already in a chronic state of disease, are put on the stretch; renewed inflammation is set up, and a relapse of pain and lameness is the certain result. To my mind, the inevitable conclusion is this: for anyone to make a horse work in this state, more especially if it be fast work, and walking upon his toe without any properly adapted support under the heels of the foot, is causing the *infliction of unnecessary pain, and that such treatment is cruelty.*

"*The Patten Shoe is of Primary Importance.*"—When a patten shoe is properly adapted to the foot of a contracted leg, the horse immediately feels the benefit of it. There are many other cases of lameness besides contracted tendons or bone spavin, in which the horse walks on his toe, and in which patten shoes will be found of very great benefit. The horse soon finds, when he puts his weight on the contracted limb, that the heel is prevented descending to the ground; the fibres in the tendons are not put on the stretch, and consequently no pain is inflicted; the animal soon gains confidence, and he walks on boldly without fear. I have frequently seen the horse start his load on his lame leg, and I feel constrained to relate an incident which occurred in my practice.

Many years ago, a horse belonging to the Lancashire and Yorkshire Railway Company had contracted tendons of one hind leg; he was a very nice horse, good in disposition and a temperate worker, but being lame was put to the job of chaining up and assisting heavily loaded lurreys from Salford goods station up Bridge Street and John Dalton Street, Manchester; this he did for six or eight months, to the entire satisfaction of everybody who saw him; even the inspector of the Society for the Prevention of Cruelty to Animals often watched and admired him. I was perfectly satisfied; one day he happened to break the patten off the shoe whilst in the midst of his work, and mark the consequence. After a few strides he came to a dead stop; no urging, no coaxing, no threats, nor even flogging, could get him to stir; but by dint of sheer force, a number of men pushing him, almost carrying him, he was got into a side street on three legs, and there he stood until a smith was fetched, who took the shoe off, got the patten welded on, and put it on the foot again; the horse then tried it, and without urging walked away; he was hooked to the lurrey, and on he went with a will. Now I take it this settles the question without a shadow of a doubt.

The Essentials in Making a Patten Shoe a Success.—In applying a patten shoe, the great *desideratum* is the height of the patten adapted exactly to the requirements of the case. To give the horse ease and comfort, it must be fitted with the greatest possible exactness—the merest trifle will make all the difference to the horse; if the patten be a quarter of an inch too high, it will often do more harm than good; if it is a quarter of an inch too short, it fails to meet the case. It is our regular practice to see the horse walk before the shoe is touched; the smith who has to fit the shoe on sees him walk, and judges what is the exact height required. We never have any toe-piece on these shoes, and we are particular in the sole being clear, and easy in the

heels. He fits the shoe, puts it on with two or three nails, and sees him walk out again; if it is seen to be a little too high or a little too low, it is taken off again and altered until it is exactly right.

As to a patten shoe increasing the tendency to contraction, I attach no fear or apprehension whatever of its doing anything of the kind.

The patten shoe being higher than the other shoe, it makes one leg longer than the other; it gives the horse the appearance of being lame, but this is more apparent than real; look at the horse after he has been using the patten shoe a few months; he is improved in condition, he is not nursing his leg and continually shifting his position, as he was always doing before; watch him again, you see he is no longer pottering about, feeling for and trying to find the hole in his stall. No, that hole is not needed now; we see him as he faces his manger, he is getting on with his eating, and the aching, torturing pain is gone.

Manchester, *Sept. 22nd.* THOMAS GREAVES, F.R.C.V.S.

NOTICE.

IN reply to inquirer, with regard to works on diseases of the dog and cat in German and French, we have to state that, so far as we are aware, the best German book on the dog is Hertwig's, which has passed through several editions; a very good translation of it into French is that by Scheler, entitled, "Les Maladies des Chiens et leur Traitement," published at Brussels by Rozez. We do not know of any special work in German dealing with diseases of the cat. In French, the most recent work on the dog is that written by Pertus, entitled, "Le Chien, Races, Hygiène, Maladies," and published by Bailliere et Fils, Paris. With regard to cats, the only book we are acquainted with is that by Benion, "Le Chat, son Histoire, ses Mœurs, Multiplication, ses Maladies," which is published by Asselin, Paris.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from J. M. Parker, Haverhill, Massachusetts, U.S.A.; W. Bryden, Boston, U.S.A.; T. H. Green, Atherstone; C. Pack, Lymington; Professor O. C. Bradley, Edinburgh; T. C. Mahon, London; H. J. Dawes, West Bromwich; J. Wilson Barker, Stuttgart, Germany; "Prevention;" T. Greaves, Manchester; P. Moir, Edinburgh.

BOOKS AND PAMPHLETS: Encyklopädie der Gesummten Thierheilkunde und Thierzucht (Leiferung 8, Band xi); Report of the Bombay Veterinary College for 1892-93; Annual Statistical and General Report of the Army Veterinary Department; Hygienic Treatment of Domestic Sewage; *M. Kauffmann*, Les Viperes de France.

JOURNALS, ETC.: *Rural World; Press Vétérinaire; Mark Lane Express; Journal de Méd. Vétérinaire et de Zootechny; American Veterinary Review; Echo Vétérinaire; Recueil de Med. Vétérinaire; Annales de Méd. Vétérinaire; Live Stock Journal; Lancet; Revue Veterinaire; Clinica Veterinaria; British Medical Journal; Modern Medicine and Bacteriological World; Baily's Magazine; Agricultural Journal of the Cape of Good Hope; Edinburgh Medical Journal; Repertorium der Tierheilkunde; Gaceta Médico-Veterinaria; Thierarzt; Monatshefte für Praktische Thierheilkunde; Ceylon Sporting Gazette.*

NEWSPAPERS: *Western Morning News; Edinburgh Evening Dispatch; Worcestershire Advertiser; Madras Times; Glasgow Herald; Manchester Guardian; Daily Chronicle.*